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Few pilots ever
expected to see the
Gee Bee flying again,
much less flying inverted.
But photographer
Russell Munson froze the
exact replica at Oshkosh
with a 500 mm lens.

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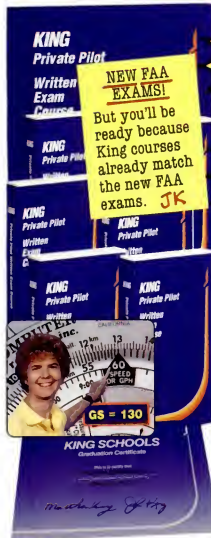
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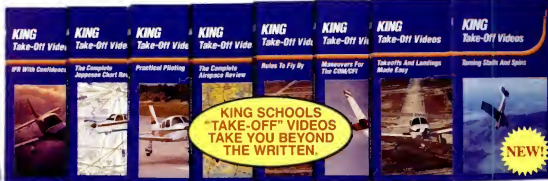
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FLYING MAIL

I thoroughly enjoyed your September article, "When Cars and Airplanes Transfer Technology, Who Wins?" in which you detailed how some of the lessons learned in styling, aerodynamics and engine design have been applied from one field to the other. The end result of this technology transfer may ultimately be the merger of these two modes of transportation, as has been the goal of the Taylor Aerocar since the late 1940s, and more recently, the Moller M-4000. It won't happen soon, but we can expect to see some marvelous innovations along the way.

H. WIL HARMAN
Auburn, Washington

Frankly I enjoy all your articles, but I have a special interest in the one on cars and airplanes. Your comments about the different areas used to define drag coefficients for cars and airplanes are apt, but I like to use drag area instead. The Lancair 320 has a parasite drag area of 1.6 square feet, whereas the Mazda RX-7 has a drag area around 7.2 sq ft. Keep up the good work. Your articles are a great contribution to the technology of general aviation.

STEVEN CROW
Tucson, Arizona

That sexy Jaguar (September '92 cover photo) from the mid-1960s is actually a street version of a mid-1950s racing design. Perhaps a truer parallel to Beech's beautiful, state-of-the-art Starship would have been Mercedes-Benz's beautiful, state-of-the-art 600SEL. But of course, I'm a little biased. Thanks for such a beautiful, state-of-the-art magazine.

BRUCE T. CAMPBELL
Mercedes-Benz of North America
Hollywood, California

A-2s in heaven?

I'm with you, Bax (Bax Seat, September). All of my life I have heard that you can't take it with you. If I am not going



WILL CARS FLY?

to be issued an A-2 when I get to heaven—well, I'll just have to make other arrangements.

DICK PINES
Palatka, Florida

Bax admits to sleeping in his leather jacket but has not announced plans to take the dirt nap in his pilot attire.—Ed.

Return to IFR

I am, at the tender age of 47, working on my instrument rating, so Peter Boody's article "Return to IFR" in the September issue hit a chord in me. I started flying at 40, got my private at 42 and have tried on and off two previous times to train for this rating. I had to both laugh and almost cry at Mr. Boody's frustrations—I've done them all and a few more!

ROSA ALLMANN
Baltimore, Maryland

What a great article on IFR flying by Peter Boody. I thoroughly enjoyed his progress log, especially his honesty in describing mistakes. Those of us who have spent time trusting the gauges can certainly identify with him. Those who haven't—but are considering doing so—should read and heed this article. Thank you, Mr. Boody.

DONALD J. SMITH
Denver, Colorado

I guess it's no wonder Peter Boody waited all that time to get back to IFR. I'd have trouble flying, too, if I held onto the yolk (sic) until my knuckles turned white. Tell him next time to leave the egg home and hold the yoke! But maybe he had the same instructor I had. Mine always told me to put an egg in my shoe and beat it.

ALAN Z. FROMM
Plainview, New York

We have egg on our face. The yolk is on us. Any more bad puns needed to atone for our editing mistake?—Ed.

Holding long

Regarding J. Mac McClellan's September Left Seat column, I know that what he discussed in the "Holding Long" section is true (pilots must taxi beyond the hold lines when leaving the runway). However, what do you do when

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that's not possible? At the airport I fly out of, the runway and parallel are too close to be on either side of the lines. Most local pilots stop in the middle. After one flight, I taxied clear, and knowing that another plane was taking off, I brought the tail all the way over the lines. Ground then told me to hold position for a taxiing DC-9. As the airliner passed by, it had to swing over far to the other side of the taxiway to stay clear, and I still had a moment of doubt about that long wing. **DOUG GUTELUS**
Ithaca, New York

When a runway exit taxiway does not provide sufficient room to taxi clear of the hold bars, do the best you can by taxiing as far forward as possible without entering the parallel taxiway until cleared by ground control.—Ed.

FAR numbers game

Regarding the September Aftermath, "Just A Little Ice," my copy of FAR 91.209 does not "... prohibit taking off any airplane with any snow or ice adhering to its flying surfaces." And I can't find such a statement, though the implication may exist, within FAR 91. Please refer me to the correct citations. Thanks.
MICHAEL ROSS
Carlsbad, California

We quoted FAR numbers directly from the official NTSB accident report, which was completed before the FAA renumbered the rulebook. You can now find the prohibition against frosty takeoffs under FAR 91.527.—Ed.

What about KLM?

September's Vectors says, "Scheduled air travel began 73 years ago. Credit Britain, France and Germany." Did you forget the Dutch? Albert Plesman was appointed first administrator of KLM in October of 1919. KLM's been operating under that same name ever since. And who explored the polar route from Europe to the United States? Not the Brits, French or Germans! BOAC saw the light just before World War II. Air France didn't exist until 1933 (a merger of four small companies) and Lufthansa was founded in 1925 (also a merger). Swissair, SAS, Qantas and Sabena all came alive in 1920 or so and Avianca was born in 1919. **J.H. DE VRIES**
Newhall, California

Morgan agrees that KLM is a great pioneering airline, but his column referred to efforts in various countries, not specific airlines. Morgan says no historian can pinpoint when and where scheduled air service began, but companies in the

countries he mentions were certainly involved.—Ed.

Thanks for the enjoyable reading that Len Morgan provides each month in Vectors. I, and I'm sure many others, related to his writing about operating the reciprocators of the 1930s and 1940s. What nostalgia! Len and I, though unbeknownst to each other, hung over the same fence at Bowman Field in Louisville during the '30s, watching with fascination the goings and comings of Americans Fords, Pilgrims and DC-2s and other GA aircraft of that era. Having retired in 1970 after 33 years of active duty with the U.S. Marine Corps, I'm still flying as an instructor and enjoying the reminiscences of yesteryear that Morgan continues to so aptly provide.

WALTER LEE HUBER
Mission Viejo, California

Go fish

Cessna Caravan salesman Peter Hall and Todd Duhnke may know a lot about airplanes ("Floats Like A Butterfly," September), but someone should have told them how to hold their fishing gear—both of them are holding their rods upside down. And with one using a spinning reel and the other a spin-cast reel, I suspect they must have been doing it intentionally to test the eyes of your readership. Either that, or they should have traded rods!

MARK E. DUPONT
Aiken, South Carolina

Duhnke and Hall may be holding the rods upside down, but the fish are hanging from the wing strut, proof positive fish don't know which way a rod should be held. Of course, we could have cheated and bought those fish to use as props in the photo, but we would never do that.—Ed.

Fake history?

Nice picture on page 41 in the September issue of the three warbirds at the Berlin show, but I gotta tell you—that's a strange Bf109. Looks like a hybrid P-40/Bf109 cross. What happened to the inverted-vee Daimler-Benz 601 this type used?

LESTER FRITZ
Wenatchee, Washington

Please inform Mike Jerram that the aircraft isn't a Messerschmitt Bf109, and the three aircraft he mentions still haven't flown together over Berlin. It's a Spanish-built aircraft, not a Bf109. Does anyone on *Flying's* staff know anything about World War II fighter

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aircraft? First the Hellcat/Wildcat fiasco, now this. Next, you'll be picturing a Lancaster and calling it a B-17. Is Garrison in charge there or something? P.S.: Otherwise, you're doing okay.

LANCE NOVAK
North Hollywood, California

You can fool airshow-goers and even those few Luftwaffe veterans who got all dew-eyed over it at Berlin, but not flying readers, it seems. Fritz and Novak are right; that "Messerschmitt Bf109" was not quite what it pretended to be. It's a Spanish-built Hispano HA-1112 Buchon, a post-WWII airplane that combined the Bf109's airframe with the British Rolls-Royce Merlin engine in place of the original Daimler-Benz powerplant. If you want to see a genuine German-built Bf109 fly, you'll have to come to England, where the Imperial War Museum has recently restored the world's only airworthy example.—M.J.

More CRM

Jay Hopkins's article on cockpit resource management in the September Training, which gives the leading causes of accidents, is a must-read. The human factors literature states that inadequate monitoring is often caused by information underload—failure to detect the occurrence of rare events during monitoring of routine conditions. Simply stated, the human being is not efficient at maintaining attention in settings in which there is little or nothing to respond to. For example, how often do we really look over at the pressure gauge?

KENT VAN CLEAVE
Knoxville, Tennessee

Doggone it, Mac, you're probably wondering how Cockpit Resources Management (CRM) training fits in with the Blind-Fish Factor. It fits into suggestion #10: Do habit follow-up. As I understand it, CRM gives techniques to handle various cockpit situations. Pilots who get this training will have better skills and demonstrate a better safety record in the short run. But how are pilots going to maintain this edge? These pilots are going to return to drilling miles and miles of routine holes through the sky. They will return to using procedures that eventually seem superfluous.

KEN HAZEL
Mount Juliet, Tennessee

Name game

In regards to your answer to Allan Morgan on "paddle blade" props in the September Flying Mail, the British did not name their version of the Lockheed

Ventura the "Ventura"—they named it the "Hudson." Secondly, you forgot to mention the U.S. Navy version ("Harpoon" was one U.S. Navy name) and the most-built of that series of PVs: It was/is the PV-2, which also had a fuselage modification to allow for a rear belly gunner.

CHUCK SPERLEY
Portland, Oregon

According to the authoritative Jane's All The World's Aircraft, the British name for the Lockheed (Vega 37) series was "Ventura." The British Hudson was a Lockheed Model 414 that was nearly identical to the Ventura in appearance. The British placed the original order for the Ventura, a military version of the Lodestar, in 1940 when Lockheed was known as Vega Aircraft Corp.—Ed.

Page count

Regarding your new page numbering system—you almost have it right. But why is every business-reply card counted as two pages? They are annoying enough without having to count them as pages. Once you start numbering only the actual paper, you'll have it right.

JEFF BACKHAUS
Breckenridge, Colorado

Cheers for Howard

I am disturbed every month when I see what I call Howard-bashing by your readers. I know for a fact that he gets no greater pleasure than issuing a new pilot certificate to an applicant. I work at an FBO that has sent dozens of students to Mr. Fried. I have also taken and passed two check rides, private and instrument, with him, and I am preparing for my third. I have passed each time on the first try and so do most of our students. Mr. Fried is as fair a man as I have ever met. I could go to any one of 22 DPEs or the local FSDO in my area, but there is no one I would trust more than Howard Fried.

WILLIAM COWELL
Taylor, Michigan

Doolittle sends regards

Thank you for the copy of the August *Flying*. Looks to be a well-written article and already many have come in for signature. The entire Doolittle Raiders Association appreciates the remembrances of our 50th anniversary. Every good wish to you and yours.

J.H. DOOLITTLE
Pebble Beach, California

Len Morgan is one of *Flying's* finest contributors. Each month I look forward to his stories of aviation history, both military and commercial. His

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story of Doolittle's Raiders was well-written and accurate. However there was one small mistake. Under the photograph on page 85, you have identified Adm. William Halsey as standing with Col. Doolittle. True, the medals were pinned to the bombs to be returned to Japan; but sorry, guys, any sailor worth his salt will readily recognize Capt. Marc Mischner, skipper of the *Hornet*, with Col. Doolittle. This courageous naval officer and aviator did more than his share to contribute to aviation history. Please let's give credit where credit is due.

ANDY AMBROSE

East Prairie, Missouri

Maybe you're right, Ambrose, but the National Archives files identify the man in the picture as Halsey—Ed.

The article on Doolittle's Raiders was expertly written and a timely reminder of one of America's important air combat missions. The reference to the lone B-25 aircraft to arrive in Russia should be of interest to military historians and aircraft preservationists. This B-25 and its crew landed safely in Vladivostok and later became "prisoners" of the Soviets. The crew later escaped through Iran and eventually returned safely to the U.S. A lingering question remains about the fate of their aircraft: Whatever happened to their B-25? Was it returned?

JOHN S. TREDWAY
Ashland, Oregon

According to surviving Doolittle Raiders who spoke at Oshkosh last summer, all airplanes flown in the raid were destroyed either in crash landings or by crashing after the crew bailed out. The crew arrived "safely" in Russia; the airplane did not.—Ed.

On Guadalcanal I served as flight engineer, top turret gunner on a B-24, 307th Bomb Group, 370th Squadron. One thing of note that I have never read about in any publication was the raid our group(s) made on Wake Island, Christmas Eve 1942. I say of note because we flew "for three days." We took off on the 23rd of December, crossed the International Date Line around midnight, after which it was the 25th, then on return we landed at Midway on the 24th.

THOMAS E. KILBORN
Preston, Washington

Brother's keeper?

The account of the "Thunderstorm Tragedy" in the August Aftermath left me with several questions. First, did any pilot on frequency offer any advice or suggestions to 63Q? It seems to me

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that the pilots of the deviating heavies must have listened to this incident with a pretty good sense of the likely outcome. Finally, what is the responsibility of a pilot listening to something like 63Q's flight into disaster? The controller may have failed to communicate the danger involved, but what about other pilots who were up there—should they have said something?

ALVIN F. JONES
Roswell, New Mexico

Pilots have no way of knowing the exact position of other pilots on the frequency. Only the controller has the complete picture in view, via radar. Pilots can, and often do, offer unrequested ride reports to the controller and any other pilot listening on the frequency. As for telling the captain of another aircraft how to fly his airplane—jumbo jet or single—that simply isn't done.—Ed.

I read Peter Garrison's August Aftermath with a very special and painful interest. My son, Chris, died in a similar accident on July 12, 1990, at Disputanta, Virginia, and the accident report reads almost exactly like the one detailed in the story. My son was intelligent. He was a CFI, CFII with commercial and multiengine ratings. He read a large selection of aviation magazines every month, many of which related examples in detail of tragic accidents brought about by weather. He studied weather for every rating exam he took and passed with high scores. But when the weather deteriorated during his final flight, he chose to keep charging on. His Bonanza came apart at 11,000 feet and I am left wondering why he would choose to do that with all his knowledge and experience. These young pilots (and some not so young) are only numbers on accident reports until one of them becomes your son, daughter or close friend. Then you realize just how tragic each one is to some family. Each represents years of suffering to all those who loved the victim. I wish I had some magic to impress every pilot with the dangers of bad weather. None of us have that magic, unfortunately, so I suppose we will continue to read the horrible results of the consequences in *Flying* and other publications. If each story such as Garrison's manages to save one life, then you have certainly done your job as a friend to aviation.

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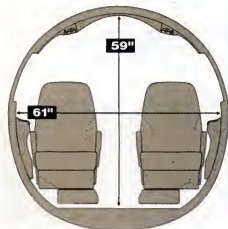
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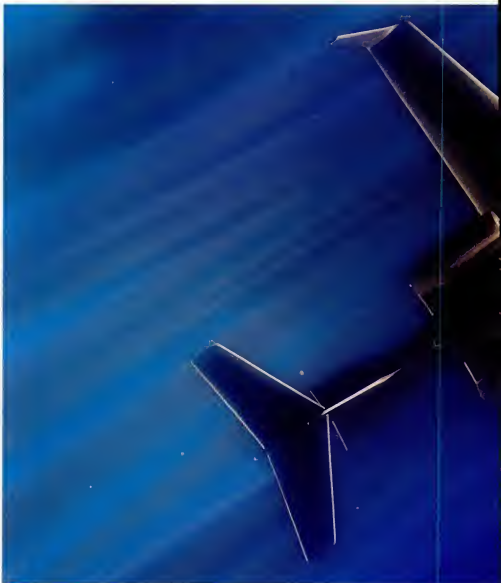


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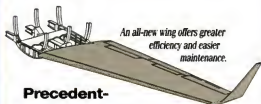
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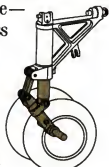


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zas to fly scientists from Albuquerque to the government's super-secret nuclear weapons labs in Los Alamos.

★ It was Presidential election season and we were unhappy with both Dwight Eisenhower and Adlai Stevenson. Neither candidate supported military airpower strongly enough to suit us.

★ The AOPA was up in arms about new avionics requirements. This time it was the control tower frequency change from 3105 to 3023.5 kc. In those days all pilots transmitted on the same frequency.

★ Boy, were we environmentally incorrect. "Whaling Whirlbird" told how a young Hiller pilot worked at spotting more than 500 whales so that they could be nailed by crewmen on a whaling factory ship.



★ **20** years ago the new pressurized Cessna P337 Skymaster was on the cover. The P337 sold for \$78,500, just 25 grand more than the naturally aspirated version. We thought that was a tremendous bargain.

★ The U.S. was recovering from an economic recession in 1972, but student pilot starts were down. The big airplane makers told us the problem was lack of airport capacity, not a shortage of new pilot interest or money.

★ A note from the Tucson, Arizona,

control tower log: 5:30 a.m.—Two stallions at the 5,000-foot mark on Runway 29R. Controllers forming posse. 6:00 a.m.—Steeds cornered. Controller cornered. Final entry—Steeds fell through the fence.

★ Cessna had a sure-fire advertisement on the inside cover. It



offered new 1973 150s, Skyhawks and Cardinals at 1972 prices. A Skyhawk listed for \$15,895.

★ Piper introduced the Navajo Chief, a stretched 10-seat version of its



successful original Navajo that had entered service in 1967.

★ Genave had introduced its proximity warning indicator (PWI), which detected nearby

transponder replies, and our man Dick Collins was flying it. The PWI didn't calculate bearing to other airplane's transponders, or attempt to establish an actual range. It merely beeped and flashed when another transponder approached. The price was \$395. □



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First, we have created an entirely new way to pinpoint areas in pilots' knowledge, skills and judgment that could be improved. It's called the Pilot Proficiency Review, and details are available at any of more than 500 Cessna Pilot Centers throughout the U.S.



The other important part of the program encourages owners to comply with special service bulletins that are so essential to aviation safety. For a limited time, we are offering the required parts at well below our cost. And we are asking all Cessna owners to heed these service bulletins with the greatest diligence. There are over 260 Cessna

Service Stations in the U.S. and Canada to help with this process.

Because the law of gravity allows no compromise, let's work together to make flying as safe as anything on earth.

For more information about the Cessna Safety Enhancement Program, contact your nearest Cessna Pilot Center or Authorized Cessna Service facility, or call 1-800-4-CESSNA.

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R E P O R T I N G P O I N T S

FAA PROPOSES NEW RULES TO BROADEN SIMULATOR TRAINING

In August the FAA issued an NPRM that would provide for the certification of **independent simulator training centers**. An FAA spokesman said that, as a result of the new rule, training centers using simulators could be set up in downtown offices, making training available to a wider range of pilots and at a significantly reduced cost. A new FAR Part 142 would be created to address certification and operating rules for simulator training. Under the proposal, as many as five of the 20 hours of flight instruction required for the private pilot certificate could be accomplished in a flight simulator or training device, provided it replicated a specific airplane. Nevertheless, the new centers are expected to cater primarily to private pilots seeking advanced ratings, commuter airline pilots who want to advance to larger aircraft, and pilots for the larger airlines who want to qualify to fly additional types of aircraft.

The new rule would expand the credit for training, testing and checking conducted on simulators or training devices at facilities operated under Parts 121, 125, 135, and the proposed 142. Among the approvals being considered under the new rule are completion of the biennial flight review and the 90-day pilot-in-command recent-experience requirements, both for day and night operations. Approvals for Part 142 schools would be handled through a national FAA office rather than local FSDOs in order to ensure standardization. Comments on the NPRM can be sent to FAA, Office of the Chief Counsel, ATTN: Rules Dockets (AGC-10), Docket No. 26933, 800 Independence Avenue SW, Washington, D.C. 20591. Deadline for comments is December 9, 1992.

REGIONAL JET GETS OKAY: The **Canadair** Regional Jet was awarded its Canadian type approval on July 31, clearing it for first deliveries to launch customer Lufthansa CityLine, of Krefeld, Germany. Three test aircraft logged 1,400 flight hours during the 14-month

Canadair Regional Jet



certification program. The fourth aircraft, which will be Lufthansa's first of up to 25, was scheduled to be out of Canadair's Montreal completion facility in time for a delivery ceremony in October. First North American launch customer of the Regional Jet is Comair. If all its options are exercised, Comair's fleet could eventually include 40 Regional Jets.

Recent tests of the Regional Jet show that at takeoff, the 51,000-pound series 100 ER version was rated at 78.6 Effective Perceived Noise decibels (EPNdB), 10.4 decibels below the prescribed Stage 3 noise limits. The Regional Jet's sideline rating of 82.2 EPNdB was 11.8 decibels below Stage 3, while its landing rating of 92.1 EPNdB was 5.9 decibels below the allowable maximum. The tests demonstrated that the Regional Jet's 80-dBA takeoff and approach noise contour covers just half a square mile, significantly less than that of the MD-82 (4.4 square miles), Boeing 737-500 (2.3 square miles), BAe 146-200 (1.9 square miles), and Fokker 100 (1.4 square miles).

CITATION SUPPORT: Greensboro, North Carolina, officials approved

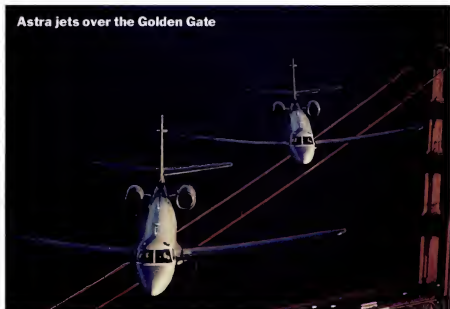
Cessna's request to locate a factory-owned **Citation Service Center** at the Piedmont Triad International Airport. The new center, to open in mid-1993, will be the eighth Cessna-owned U.S. facility dedicated to the Citation line. A ninth center is planned to serve the south-central region of the U.S., but a location has not yet been established.

FAF OF THE MATTER: There's more news on the weather fax front. As we predicted in our February fax report, Jeppesen has come out with a weather fax service, **JeppFax**, for pilots, in addition to its already-established broadcast fax service for larger operators. The on-demand interactive service does not require subscription or pre-registration; pilots call 800-677-JEPP for immediate access. A touch-tone telephone keypad is used to make

products, using the keypad of a touch-tone telephone. The requested weather information can be delivered to a fax machine specified by the caller within minutes or at a preset time.

FINISHING TOUCHES: Hangar One, the Beech-connected aircraft modifications company with shops in Tampa and Atlanta, is diversifying into high-end aircraft completions. September 1 marked the grand opening of the **Hangar One Completion Centre** at DeKalb Peachtree Airport in Atlanta. The new operation is headed by customization design veteran Byron Knowles. Interested customers can arrange a personal tour of the new facility by calling Knowles at 404/454-5070.

BET YOUR BOTTOM LINE: If a company buys a new **Astra SP** business jet



service selections and provide the phone number of the fax machine to which data should be sent, immediately or within 24 hours. Charges, which can be billed to a credit card or pre-established account, are 60 cents for an airport briefing, \$1.25 for a one-panel map, \$1.65 for a one-panel satellite image, \$1.95 for a two-panel map, \$2.35 for a two-panel satellite image, and \$1.50 for en route and other text briefings.

Accu-Weather Fax subscribers can now have weather maps, charts and data automatically faxed to them regularly at a preset time. Subscribers dial Accu-Weather's toll-free number (800/234-4FAX) to request specific weather

and doesn't see a benefit in its bottom line after one year from the delivery date, Astra Jet Corporation will pay the company \$100,000 cash. That's the promise Astra Jet is making in a new series of ads appearing worldwide. The company hedged its bet by surveying the experience of past purchasers before deciding to go ahead with the advertising campaign. The offer applies to companies with existing flight departments as well as those that buy the Astra SP as their first airplane.

NEW CPS FBO: Avtec, Inc. at St. Louis Downtown-Parks Airport in Cahokia, Illinois, recently completed the transition from repair station to full-fledged

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FBO. Development of the new FBO complex, which is in addition to Avtec's existing maintenance complex, involved the conversion of one of the airport's original Curtiss-Wright hangars (circa 1929) and the addition of a 24,000-gallon fuel farm.

AVFUEL ADDS OUTLETS: **Rengo Brothers Aviation Operations**, which sells aviation fuel to small regional airports in Michigan and Wisconsin, has been acquired by Avfuel Corporation. Avfuel will continue to service Rengo Brothers' customer base.

STATE FUNDING INFO: The **1992 State Aviation Tax Revenue Report**, released by the National Association of State Aviation Officials Center for Aviation Research and Education (NASAO/CARE), found that most state aviation programs are funded by state taxes on aviation fuels. Every state but Texas imposes some form of excise tax or fuel tax on avgas and/or jet fuel; more states tax avgas than jet fuel (40 to 32). All or part of those revenues go into either a dedicated aviation fund (31 states) or general, highway or transportation funds that are in turn tapped to fund aviation programs. Taxes range from a low of .08 cent per gallon (Oklahoma) to a high of 26 cents per gallon (Rhode Island), with the average running 7.9 cents on avgas and 4.2 cents on jet fuel.

AVIALL HANDLES TBM PARTS: TBM has appointed **Ryder Avial** as the North American parts distributor for its TBM 700 single-engine turboprop. The agreement covers the United States, Canada and Mexico. Ryder Avial already distributes some parts for Aerospatiale's Caribbean fixed-wing series.

BAE'S 125 TOPS 30: It was more than 30 years ago, on August 13, 1962, that the prototype **D.H. 125** (G-ARYA) lifted off from Hatfield, England, on a 56-minute maiden flight. Eventually four planes took part in the flight-test program that culminated with the

granting of the type certificate in 1964. Two of those first aircraft were assembled at Hatfield from components manufactured at BAE's Chester plant, but the other two and all subsequent 125s have been assembled at Chester. Sales of the 125 series have averaged one every eight working days since its introduction. Total sales of all variants is now at 823. Over the years, the product line has evolved from the earlier Viper-powered versions to today's Garrett-driven BAE 800 and the top-of-the-line BAE 1000 with its pair of parsimonious Pratt & Whitney PW305s. The first 125 had a VFR range of 1,110 nm; today, the Model 1000, with a 50 percent greater payload, can cover 3,600 nm. Production of at least some of the future 125s could move from the ancestral home at

The 125 prototype
30 years ago



Chester as a result of ongoing discussions with Beech parent Raytheon for a stake in British Aerospace's business-jet business.

BLOWING IN THE WIND: Hurricane Andrew provided a graphic demonstration of **WSI's** recently introduced GOES-Meteosat mosaic image. Since the infrared satellite picture is a combination of the images produced by the Geostationary Orbiting Environmental Satellite (GOES) and the European Meteosat Satellite, it offers a wide-scale view of the hurricane breeding grounds in the Atlantic—from Africa to the east coast of the U.S. With images from both satellite systems, WSI subscribers were able to follow Andrew as it was spawned off the coast of Africa, swept across the Atlantic, and ravaged southern Florida and Louisiana before blowing itself out. As Andrew approached Florida, WSI was able to get radar images from two sites—West Palm and Tampa—and provide subscribers with composites and mosaics showing Andrew as it crossed Florida.

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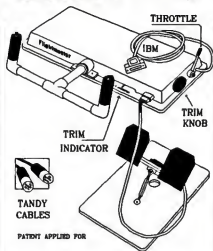
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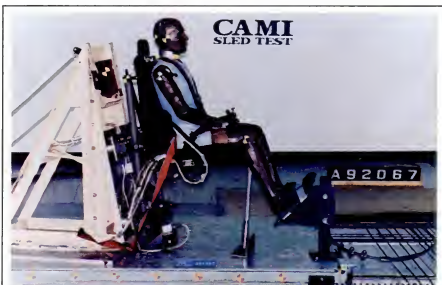
PERSONAL SIM: MDM Systems' FS-100 Instrument Flight Simulator features a flight control console and software that runs on IBM or compatible PCs. The control console allows the pilot to use knobs and switches rather than mouse or keyboard commands to control all non-yoke functions. The program allows practice sessions to be saved to disk for later review, permits users to stop a replay in order to examine the instrument readings, and offers a custom database centered around an airport of the user's choice; virtually any airport in the world is available. Minimum hardware requirements include 286 IBM PC, or compatible, with 640K memory, serial port, and color VGA graphics. Price of the FS-100 is \$595. For further information, call 800/732-2800.

MIX AND MATCH: On August 21, Cessna's Citation VII test-bed aircraft took off with an **Allison GMA 3007** engine on its right side. The flight kicked off a year-long flight-test program for the engine that has been selected to power Cessna's Mach .9 Citation X. The 6,000-pound thrust engine dwarfed the test plane, but a full scale mock-up of the Citation X at the National Business Aircraft Convention in Dallas put everything in perspective. The Citation X is expected to make its maiden flight in 1993, with customer deliveries slated for 1995. In the mean-

time, Cessna's Williams/Rolls-Royce FJ44-powered CitationJet is cruising toward certification with the first delivery set to take place before the end of this year. The first production CitationJet left the paint hangar in late August and was being prepped for a first flight in early September as the first two test aircraft continue to fly the certification chores.

CAN-DO ATTITUDE: The **Corporate Angel Network (CAN)** celebrated its first decade of service to cancer patients at the National Business Aircraft Association Convention in Dallas. Since 1981, CAN has flown more than 5,000 patients and their traveling companions to or from specialized cancer treatment centers. Travelers use available seats on corporate aircraft—seats that would otherwise go empty—at no charge. Currently 525 corporations participate in the program. CAN arranges approximately 75 flights each month.

Angel Flight, the volunteer pilot network whose main mission is to provide transportation for medical patients in need, was one of the early organizations involved in relief of the Florida victims of Hurricane Andrew. Forty-five pilots and 20 copilots flew almost continuously for four days, bringing in food, water, clothing and construction materials. Aircraft involved were primarily singles, with a sprinkling of light



The pilot's seat—the only seat in the new Kaman K-MAX utility helicopter—is the first to meet new FAA rules for crashworthiness. The dummy survived a 26-G vertical stop at the FAA's test facility.

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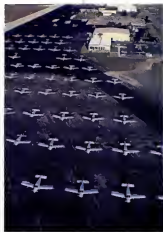
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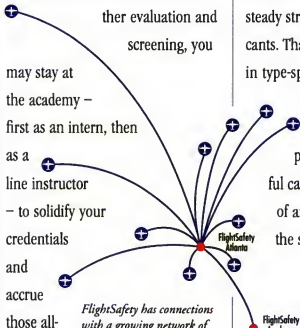
candidate you'll become a pilot with a commercial license and multi-engine ratings. Pending further evaluation and screening, you may stay at the academy – first as an intern, then as a line instructor – to solidify your credentials and accrue those all-important hours of flying experience.

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or so regionals – such as Northwest Airlin, AirVantage, and Business Express – that look to us for a steady stream of well-trained applicants. That allows us to train you in type-specific equipment for the airline that made you the offer. The career path then leads the successful candidate to the right seat of an airliner. And from there, the sky is the limit.

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twins; size ranged from a 1940s Air-Coupe to a restored 1937 B-50 Bamboo Bomber. Angel Flight pilots normally donate their own time, aircraft and fuel, but to keep the airlift running, Angel Flight provided an additional 6,000 gallons of avgas. Donations to offset the cost may be sent to Angel Flight, Southeast Chapter, 21521 Woodchuck Court, Boca Raton, Florida 33428.

FDC ADDS RADAR: Pilots using Flight

Data Center terminals at FBOs, or FLIGHT PLANNER software on their own PCs, are now able to access 102 National Weather Service radar sites through the system. Regional composite radar overlays radar echoes from several radar sites on one regional background. FDC, with Excel Software Corporation, will soon be offering a ROUTE GENERATOR program that will provide the shortest victor or jet airway route and file it.

GAMA PUTS IT IN WRITING: The General Aviation Manufacturers Association has released two new brochures designed to provide the public, opinion leaders, and policymakers with a thorough understanding of the value of general aviation aircraft. "Business Aviation—Aircraft = Productivity, Safety, Efficiency" outlines the role business aircraft play in today's economic environment and provides case histories illustrating ways aircraft improve corporate efficiency. "Government Aircraft—An Essential Tool" examines how aircraft are used by states and the federal government to provide or support many of their programs and services. Single copies of the brochures are available free from GAMA at 202/393-1500.

THE LEASE YOU CAN DO: Beech Aircraft is now offering its **Starship 2000A** on a 10-year lease program for \$35,950 per month. The program includes free maintenance (covering everything except consumables and engine reserves) for the first two years or up to 600 flight hours. Can't plan 10 years ahead? An extra-cost option is available that terminates the program after five years.

JET AVIATION ADDS TO ITS HOLDINGS: With a formal ribbon-cutting ceremony on September 16, Jet Aviation celebrated the acquisition of what had been the Falcon Jet Teterboro Jet Center at New Jersey's Teterboro Airport. The addition expands Jet Aviation's existing FBO and maintenance base at Teterboro. □

CALENDAR

November 8. 4th Annual Warbird, Antique and Classic Fly-In. Airshow, barbecue. Winter Haven Municipal Airport, Winter Haven, Florida. Phone 813/293-2501.

November 8. Fall Fly-In and Airport Day Open House. Half Moon Bay Airport, Half Moon Bay, California. Phone 415/726-3417.

November 9-11. Regional Airline Association Annual Fall Membership Meeting. Hilton at Disney World Village, Lake Buena Vista, Florida. Phone 202/857-1170. □



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BONAZZA WINS GLOBAL AIR RACE

Steven Nagorny, of York, Pennsylvania, and Robert Wahl, of Rochester, New York, won the Round-The-World Air Race in a Bonanza fitted with huge tip tanks. The racers departed Geneva, Switzerland, on June 20, and completed the course at Cannes, France, on July 11. The route took racers across Russia and the northern Pacific and Atlantic Oceans.

The mother-daughter team of Marion Jayne and Nancy Palozola finished second in a souped-up Twin Comanche flying with custom Hartzell props. A spinner broke on the final leg of the race and punctured a hole in their windshield, but Jayne and Palozola were able to continue to the finish. Bruno Kepler and Nicolas Poncot of Switzerland finished first in the turbine division flying a Piper Cheyenne III. Twenty-seven piston airplanes and six turboprops competed.

The race was scored on a handicap system. The winners were those pilots who bested their handicap by the greatest margin, not the airplanes that posted the highest groundspeeds. □

NEW REMEDIAL TRAINING RULES

New FAA Administrator Thomas Richards announced at Oshkosh that pilots do not need to admit to an FAR violation before participating in "remedial training." The FAA uses remedial training in place of certificate suspensions whenever possible to deal with rules infractions by pilots. Emphasis on pilot education and counseling rather than mandatory penalties was begun two years ago.

Some pilots, though they are willing to participate in remedial training, do not want to admit to an FAR violation. Richards said the FAA never intended to put pilots in the position of having to plead guilty to a rules violation and he ordered these words, "and an acknowledgement that an apparent rules violation has occurred," stricken from the agency's Compliance/Enforcement Bulletin 90-8.

The FAA expects pilots to cooperate during the investigation of a possible rules infraction. Pilots must also pay the cost of the remedial flight instruction, the instructor must be approved by the FAA, and evidence must be submitted that the training covered the areas specified by the FAA. □

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LOGBOOK

You can fly a Lockheed Constellation," it says on the front of a flyer I picked up at Oshkosh this summer. Now *there's* an invitation, guaranteed to pique the interest of any propliner pilot whose pension survived airline deregulation, and of any baby-boomer with dim distant memories of a trip to grandma's house on board Lockheed's

flyer notes, "the Connie requires a thorough and intensive introduction." At one o'clock, after lunch, you arrive at the airplane for 45 minutes of walk-around and cockpit familiarization. At 1:45 the engines are fired up, and at two you line up and push those throttles toward the far end of the runway.

Each class comprises three pilots, each of whom spends one hour at the controls and observes the others for the remaining two hours aloft. The hour of stick time covers handling characteristics, emergency procedures and crew coordination, and concludes with three takeoffs and landings, the last of which is completed at five p.m. If you hold a multiengine rating you re-



BUZZ HOLZ

magnificent old piston-pounder. Of the 856 Connies built, only 65 remain, and most of those are in museums.

Two of the five still flying were in the sky over the EAA show, in tight formation at times, and what a wonderful sight and sound they made. The red-and-white Save A Connie L-1049G was joined this year by a polished-aluminum L-749A (C-121A) in the uniform of the Military Air Transport Service, and it is this gleaming short-fuselage Connie that is available for stick time. The price tag for the full-day program is \$3,995, plus whatever it costs you to get to Tucson, Arizona. That's a big chunk of pocket money, but remember that a year ago you couldn't buy stick time in a Connie at any price. A full type-rating course is also available.

For your four grand you receive by mail an aircraft operating manual and aircrew operating instructions, as well as laminated checklists, an aircrew pocket reference manual and a ground-school quiz. At Tucson two weeks later you sit through four hours of ground school, after which you will know enough about the airframe, engines, systems, weights, airspeeds and operating procedures to take the helm. "Being somewhat more complex than a typical general aviation aircraft," the

ceive a certificate proclaiming you capable of acting as a Second-in-Command crewmember in a Constellation. (Hang it on the wall alongside your amphibious blimp ticket and other richly rewarding but near-useless ratings.) If you don't have a multiengine rating, you get a certificate that will mean the world to you and somewhat less to the FAA. You also leave with the obligatory Constellation cap, T-shirt, jacket, and "That's me in the Connie" photo. For a schedule of classes and a course application, contact The Constellation Group, 15111 North Hayden Road, Suite 160-190, Scottsdale, Arizona 85260; telephone 602/443-3967; fax 602/585-5086.

And while we're on the subject of keeping old triple-tails flying, let's not overlook the people who got the Save A Connie (SAC) L-1049G back in the air. They still need money to keep her up there. SAC already has nine type-rated Connie pilots, and they fly the airplane about 100 hours a year. SAC is classified as an educational foundation, making the \$10-per-month or \$110-per-year membership contribution tax-deductible. Apart from the satisfaction of helping to keep the old ship airborne, members get ride privileges and discounts on SAC goodies. If you want to

join (or if you want the Connie to appear at your airshow for the cost of fuel, and rooms and ground transportation for the crew), write to Save A Connie, P.O. Box 9144, Kansas City, Missouri 64168; telephone 816/421-3401. SAC is also about to fly a restored Martin 4-04, in which \$500 charter memberships are invited. SAM, son of SAC?

Denney's "other interests"

Dan Denney said that part of the reason he sold the Kitfox operation was to give him time to pursue other interests. In the language of corporate personnel announcements, "pursuing other interests" often means that the not-so-dear departed is out on the street and out of ideas. Not so with Denney, though. For a start, he will remain as a consultant to SkyStar Aircraft (the new name for what was Denney Aircraft) for up to seven years, and he and SkyStar owner Phil Reed were inseparable while at Oshkosh.

Denney's other interest is a three-quarter-scale, all-carbon-fiber P-51 Mustang kit with two seats and dual controls. It will be powered by an all-new, normally aspirated, 610-cubic-inch V12 producing 650 hp at 4,500 rpm, the developer of which prefers to work in obscurity at this stage. Denney has been working on the project for three years now, and he's set up shop as Papa 51 Corporation, across the street from SkyStar. The prototype should be flying by late next summer, and the goals are enticing: 435-knot VNE (three knots short of a real P-51's), 304-knot cruise, 5,500-fpm rate of climb and 1,000-hour build time. The V12 included with the kit will be the only engine allowed in the airplane; Denney doesn't want builders messing around with any other installations in an airplane this potent. The price has yet to be set.

Another reason Denney sold the Kitfox program was to escape from the telephone and return to designing and building, so he says please don't call him. If you want to be on a mailing list to receive details when they're ready, send your name and address to Papa 51, 2920 Port Street, Nampa, Idaho 83687.

MLS: Moribund landing system?

General aviation interests have long opposed adoption of the microwave landing system as a replacement for ILS, and they gained a powerful ally earlier this summer when United Airlines rejected the system at an FAA MLS Program Managers Conference in Kansas City. United is taking delivery of more

than one new aircraft a week, and the airline told the FAA that it's not willing to spend a dime on making provisions to carry MLS. Instead, the carrier will continue to spend money on researching GPS and advanced flight management systems: "It's time for a reality check. MLS is a costly system that the prime benefactor doesn't want."

And the winner is . . .

Paul Gould, of Webbers Falls, Oklahoma, won the Kitfox kit in the Aircraft

Spruce & Specialty sweepstakes. He'll have his hands full because he is already building a Glasair RG, due for completion in January or February. Gould and his friend Gary McCall plan to start work on the Kitfox right away and to work on both airplanes simultaneously in Gould's 40-by-50-foot shop. The prize in Fullerton, California-based Aircraft Spruce's 1993 sweepstakes will be a Lancair 320 kit. Call 800/824-1930 for details.

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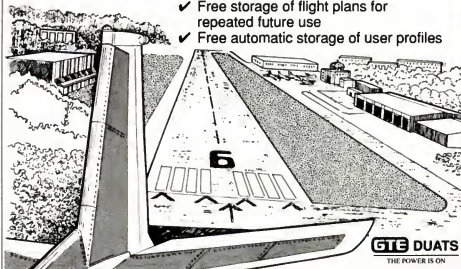
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BLUE SKY FLYING NOW ON VIDEO

Out Of The Blue, available by annual subscription (four issues for \$99.95 plus \$6 shipping) or single issue (\$29.95 plus \$1.50 shipping), is a video aviation magazine "aimed at the EAA constituency and those who have a developing interest in aviation but are not yet pilots or aircraft



builders/owners," according to its producers. It doesn't delve very deeply into the subjects covered, but the tape (the third in the series) reviewed for this report is entertaining. In 90 minutes, it takes the viewer on a tour of the Stoddard-Hamilton facility in Arlington, Washington, then for a flight in a Glasair IIS, and then for chats with some builders (one of whom notes the importance of having spousal support for the project: "If you're fighting City Hall all the time, you're in trouble from the start"). Next the "Blue Crew" visits a school that will teach you how to fly the T-6 Texan and then rent you one for \$255 an hour. Next stop, a tour of Mojave Airport, perhaps the most unconventional airport in the country and, in the words of resident Dick Rutan, "the last bastion of cowboy flying." The tape goes on to do an enthusiastic product review of the Flightmaster hand-held flight planner.

It follows with a tour of the Avid light-aircraft factory in Caldwell, Idaho, and word that an Avid Flyer is the prize in an *Out Of The Blue* sweepstakes. In "Construction Corner," Van's RV builder Alan Tolle (he's built five of them) offers tips for homebuilders, concentrating in this issue on the right way to make a metal wing rib conform with the future contours of the airfoil.

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WRITE IN NO. 26 ON READER SERVICE CARD

And, to round off the tape, *Flying's* own Gordon Baxter provides some southern-fried hangar flying in "Baxter's Hangar."

As producer/writer/director Rick Lindstrom points out, *Out Of The Blue* walks a fine line in the creation of the series, attempting to appeal to experienced aviators as well as novices and "wannabes." Says Lindstrom: "We try to include something for everyone, covering most aspects of sport aviation without getting too technical in the process." With that charter, the video succeeds. For more information, contact First Light Productions, 20511 Skywest Drive, Hayward, California 94541; phone 800/657-7483.—N.M.

BURGLAR ALARM NOW CERTIFIED

For less than \$500, light airplane owners can now buy an FAA-approved burglar alarm that affords them much the same protection as automotive car alarms. Thompson's TA 100 Midnight Patrolman is the culmination of four years of development by Harold and Michael Thompson, a father-and-son technician team from Washington state.

The Midnight Patrolman was granted a supplemental type certificate by the FAA in late 1991 and it's now approved for installation in more than 90 general aviation aircraft. The 2.4-pound system is connected to the aircraft's battery and draws 120 microamps continuously—about 2.5 percent as much as the clock. The Midnight Patrolman also has an internal battery that can power the siren for up to one and one-half hours.

The system is wired to switches on entry doors, access panels and the engine cowl. If an intruder attempts to gain access to the airplane through any of the protected doors or panels, the alarm's siren blares an alert that can be heard hundred of yards away.

Future versions of the Midnight Patrolman may be connected to the aircraft's strobe or anticollision lights to add a visual deterrent.

The Midnight Patrolman is priced at \$495, including all parts and wiring. The estimated installation time is eight hours.

For more information contact Harold Thompson, Thompson Burglar Alarm Systems, 36516 North Echo Road, Deer Park, Washington 99006; telephone 509/292-2162, or Michael Thompson, P.O. Box 2361, Gig Harbor, Washington 98335; telephone 206/857-2645. □



"Learning to fly helicopters was the best decision I ever made."

Mark DeWolf
Columbia Helicopters



Getting where he is today wasn't easy for professional helicopter pilot Mark DeWolf. Like many young would-be pilots, Mark found that finances presented a major challenge to completing his helicopter education. But, like others, he found that with dedication, hard work and help from a supportive family his goal could be reached.

Today, Mark flies the powerful, impressive Boeing 107 twin-turbine, tandem-rotor helicopter for Columbia Helicopters based in Portland, Oregon.

"What I like most about this job," says Mark, "is the lifestyle. We move with the helicopter to different logging sites around the Pacific Northwest, sleeping in tents and motorhomes. It's a lifestyle that wouldn't suit everyone, but I wouldn't trade it for anything."

Mark feels good about his job as co-pilot on the big Boeing. "Helicopter logging is the most environmentally friendly way to harvest trees," says DeWolf, "and my job with Columbia has opened up a lot of future opportunities for working around the world."

Mark trained at Helicopter Adventures while working part time as a lab technician to meet expenses. "I couldn't have chosen a better flight school," says Mark. "The training was very thorough, very professional. I always felt

that the staff cared about my training and my career, even long after I finished at HAI."

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A MATTER OF CHANCE?

B Y P E T E R G A R R I S O N

The National Weather Service assigns thunderstorm intensities to six levels, based on the radar reflectivity of precipitation within the storm. Level 1 is "weak"; the adjectives progress through "moderate," "strong," and "very strong" to "intense" and, finally, "extreme." The descriptions of both Level 3 and Level 4 storms include severe turbulence and lightning, with the difference that while severe turbulence is merely possible in a Level 3 storm, it is likely in a Level 4.

The *Airman's Information Manual* characterizes severe turbulence as "turbulence that causes large, abrupt changes in altitude and/or attitude. It usually causes large variations in indicated airspeed. Aircraft may be momentarily out of control."

The past decade has seen a sharp increase in awareness of the hazards of thunderstorm-related turbulence, particularly on the landing approach. We have also acquired a vocabulary—"wind shear," "downburst," "microburst"—which creates a comforting appearance that thunderstorm turbulence is well understood. Nevertheless, disastrous thunderstorm accidents still occur. In spite of our elaborate taxonomies, the decisions of pilots make all the difference in the end.

During a summer evening in 1991 at Birmingham, Alabama, a thunderstorm passed directly over the airport and the Runway 5 ILS. Six airplanes approached Birmingham during the storm, intending to land. Three diverted to other airports. One held until the thunderstorm had passed, then landed safely. Two attempted approaches during the storm; one landed safely, the other crashed.

The one that crashed was a 19-passenger Beech 99 turboprop commuter arriving from New Orleans. The airplane destroyed two houses and two cars; of the 13 passengers and two crew aboard, only the captain and one passenger survived. The National Transportation Safety Board's report on the accident summarizes the passenger's

account of the last moments of the flight:

"He stated that the flight was very smooth and uneventful until arriving in the Birmingham area. The cockpit door was open, and he could see out the windscreen. He stated that just be-

**AS THE AIRPLANE
SUDDENLY EXITED
FROM THE CLOUD, HE
OBSERVED HOUSES 150
TO 200 FEET BELOW,
BUT HE LOOKED AWAY.**

fore the accident he saw 'an incredibly black cloud' directly ahead that reminded him of thunderstorms he had observed on previous occasions from his office window overlooking Birmingham. The passenger stated that he and other passengers discussed whether the crew actually intended to fly through the black cloud in their approach to the airport. He saw blue sky to the right of the cloud, and the edge of the cloud could be seen clearly. The airplane then seemed to bounce upward twice. As they entered the cloud, he said there was torrential rain.

"He then looked out of his window and could not see the ground. He saw 'a muffled white light' ahead like 'a lightbulb seen through cellophane' but did not hear the sound of thunder or observe lightning before or after the airplane's entry into the cloud.

"He said the airplane then lifted suddenly to the right, 'as if the pilot was steering it out of the cloud.' He said that the airplane then entered a series of violent motions, including a severe left bank during which he believed that the airplane's wings might have become vertical to the ground. He said that the airplane then 'came about' and seemed

to be spinning like a corkscrew. He thought the airplane might have been upside down during these maneuvers. At some point, he was pressed against the window next to his seat. He believed the flight crew did not have control of the airplane at this point. Until the airplane came out of the cloud, he was unaware that they were descending. As the airplane suddenly exited from the cloud, he observed houses 150 to 200 feet below, but he looked away from the ground prior to impact. He did not remember the impact."

After the crash the passenger found himself belted in his seat in the living room of a private residence. He unbuckled his safety belt and stood up. An elderly resident of the house told him his hair was on fire. Together they extinguished the fire and then, with two other residents, left the partially demolished house via a rear window.

Witnesses on the ground reported lightning and wind that bowed the trees, but no hail, at the time of the accident. One witness was of the opinion that lightning had struck the airplane. One described the airplane as "turning like a rotor blade and descending at a steep angle." Several saw the airplane pitch up steeply before impact.

As the flight was nearing Birmingham, the first officer had been pumping the captain, who was considerably his senior in both age and experience, for "war stories." The captain obliged by telling of how he had had a double flameout once near Birmingham, and then of how he had landed a Beech 99 on its baggage pod when the main gears refused to come down. He had once lost an engine on a 99 on takeoff; "We were treetops comin' in." On another occasion he had had a prop on a Nomad throw ice right through a cabin window.

At 1744:43 the crew monitored the Birmingham ATIS, which made no mention of thunderstorms. At 1750 the captain interrupted his own recital to tell the first officer to ask center for a deviation around weather. The follow-

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ing abbreviated transcript covers the period leading up to the accident. "LEX508" is the accident flight.

[CAP = the captain; COP = the first officer; CTR = Atlanta Center; APP = Birmingham Approach; ATI = Birmingham ATIS; 5ZP, 9SP = other aircraft approaching Birmingham. Intrac cockpit conversation is in italics. Times are Central Standard Time.]

TIME: 1753:54

CTR—508 descend and maintain 6,000, pilot's discretion.

COP—Pilot's discretion to 6,000, LEX508. *Might help us with this weather, huh?* And LEX508 would like to leave nine for 6,000 at this time.

CTR—608 roger, that's approved.

COP—508.

CAP—*Let's do a descent check, that's all.*

COP—*Okay, landing lights are on. Altimeters 29.96.*

CAP—*Set.*

COP—*Set on the right also. Company, let's see, I'll call in just a minute.*

ATI—This is Birmingham Airport Information Whiskey. Birmingham 2250 weather, measured ceiling 4,200

**"ALL RIGHT, WE'D
LIKE TO GET A RIDE
REPORT FROM HIM AND
THEN TURN BACK AND
TAKE A BETTER LOOK
AT IT ON THE RADAR."**

broken, visibility seven miles, thunderstorms. Temperature 84, dewpoint 68, wind 350 at eight, altimeter 29.97. Large thunderstorm northwest of airport moving southeast, east moving southeast. Thunderstorm began at 40 past the hour. Low-level wind-shear advisories in effect. ILS Runway 5 approach is in use, landing and departing Runway 5. Runway 36. All departing aircraft contact clearance delivery on 120.9 or 390.8 prior to taxi. Advise approach or ground on initial contact you have Whiskey.

TIME: 1758:40

COP—*Pretty big guy.*

CAP—*Yeah.*

COP—*That's the one that's northwest of the field there.*

CAP—*Well... we're 46 from Vulcan, yeah. Should be able to get under that, I*

mean, go around that.

CTR—LEX508, contact Birmingham Approach 132.2.

COP—132.2, LEX508, thank you.

APP—020, you're five miles from McDen, maintain 2,600 until established on the localizer, cleared ILS 5 approach.

5ZP—And ZP, I think we better make a left turn here and go out and hold for a while, it looks pretty bad on the radar.

[After Learjet 5ZP abandons his approach, a Warrior deviates to another airport. LEX508 checks in with Birmingham and receives clearance to descend to 4,000 feet. A Navajo, 9SP, calls approach.]

TIME: 1800:38

9SP—9SP, we're gonna need to deviate away from this cell now. But are we in the vicinity of the race track? Cause I don't think I can penetrate any closer.

APP—The race track is about five miles north of your position. You were headin' pretty close towards it and if you can't get any closer than that it's probably gonna be a while till you get to it, 'cause that field is right over the airport movin' southeastbound. Looks like it's probably gonna take at least a half-hour, 45 minutes before it gets out of your way.

9SP—9SP, let you know in about a minute.

TIME: 1801:41

5ZP—Birmingham, 5ZP, do you have anybody on the ILS there last few minutes?

APP—I've got one on there right now, well, I don't have it, the other controller has one on the approach right now. He's just about where you turned out on the approach.

5ZP—All right, if we could we'd like to get a ride report from him and then turn back and take a better look at it on the radar here in just a few minutes.

APP—Navajo 9SP, what do you want to do, due to this weather? What are your intentions?

9SP—9SP, I think what I'd like to do if it's only going to be 20 minutes or a half-hour maybe, [is] orbit around the Galleria at about 4,000 feet and just observe the storm.

APP—Navajo 9SP, climb and maintain 5,000. You can just go ahead and orbit the Galleria area but I need you at five. [In the meantime, the crew of LEX508 is performing the pre-landing check-list. The captain tells the copilot to inform the passengers that they may be delayed.]

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APP—LEX508, just to let you know what's goin' on, I had a Lear set up on the base from the southeast for the ILS to 5 and he got in a little close and saw something on the radar he didn't like, so he turned out off the approach and he's holding right now. I do have an Aerostar on the approach and he's on about a two-mile final right now, we're tryin' to get a ride report out of him.

APP—I'm waiting for that right now and, LEX508, fly heading 020 and intercept the localizer, track it inbound. I should have a report here before you get to about 12-15-mile final.

APP—LEX508, the AeroStar said that the ride wasn't all that bad, but the rain had the visibility down to about zero till

5ZP—Yeah, we copied that and we'll give it a try here.

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COP—*Okay, so far it's all right.*

The captain recalled that he could see the ground during much of the upset. The pitching and rolling motions of the airplane exceeded the power of

estigators that
ne had turned
over to the first
at the approach
what are you
ght at first that
ne was due to

48

the elevator and ailerons; he did not know whether the airplane had stalled, but he did know that he was unable to arrest its descent, and that it struck the ground in a near-wings-level attitude.

The Learjet, following LEX508 in on the localizer, was unaware of the accident. But the crew observed several cells ahead on the radar, as well as cloud-to-ground lightning, and once again abandoned the approach. Ten minutes later the storm had moved clear of the airport, and the Learjet made a successful visual approach from the north, encountering neither turbulence nor rain.

The captain's remark to the first officer—

**THE ODDS OF
ENCOUNTERING SEVERE
TURBULENCE IN A
LEVEL 3 STORM ARE
ABOUT EIGHT PERCENT.**

cer—"If you don't feel comfortable about this let me know"—suggests that he was aware that some pilots might consider the approach unwise; but, perhaps because of the old salt-young pup dynamic of the cockpit, the first officer's diffident reply contains only the slightest hint of uneasiness.

The NTSB cited the captain's decision to make the approach as the probable cause of the accident. The Board concluded that, probably encouraged by the Aerostar's success, the captain made a conscious decision to try the approach even though he knew it meant flying at low altitude through a mature thunderstorm.

The NTSB found "striking" the absence of any discussion between the two pilots about alternatives to flying the approach. The Board expressed concern that, although pilots receive lots of training in thunderstorm avoidance, they tend to think in terms of mastering the skills to "handle" thunderstorms rather than in terms of avoiding them altogether. At the same time, the Board urged that pilots be provided with recurrent training in recovery from unusual attitudes in IMC—although it appears in this case that the airplane had about as much chance as a toy boat in a washing machine.

According to the National Severe Storms Laboratory, the odds of encountering severe turbulence in a Level 3 thunderstorm (based on a large

number of experimental thunderstorm penetrations by Air Force aircraft) are about eight percent. Since severe turbulence is localized within a storm, the fact that one airplane flies through and reports a good ride does not suggest that another might not encounter severe turbulence. "The Safety Board," says the accident report, "also questions the prudence of the approach conducted by the pilot of the Aerostar, given that the dynamics of a mature thunderstorm cell were present... The

Safety Board believes that the fact that the Aerostar did not encounter the extreme weather situation experienced by LEX508 was a matter of chance."

This article is based solely on the National Transportation Safety Board's report of the accident and is intended to bring the issues raised to the attention of our readers. It is not intended to judge or to reach any definitive conclusions about the ability or capacity of any person, living or dead, or any aircraft or accessory. □

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B Y J A Y H O P K I N S

On a dark November night in 1979, a Citation 500 took off on a cargo air-taxi flight. The weather at the destination was reported as indefinite 500 feet sky obscured, visibility one mile in snow, blowing snow, sleet and rain. Certainly difficult conditions even for an experienced crew, but the pilots of this Citation were not experienced. The 29-year-old ATP-rated pilot had 1,751 hours total time but only 61 hours in the Citation and had upgraded to captain only six days prior. The copilot had been certified to sit in the right seat of a Citation only two days earlier. The aircraft crashed, exploded and burned during the ILS approach.

The statistics tell the full story: Almost half of all accidents happen to pilots with less than 100 hours in the type of aircraft they are flying. It is easy to just write this off to simple inexperience and let it go at that, but if we are going to make a serious effort at improving the accident rate, we have to delve more deeply into these statistics to determine what is happening and if there is anything we can do to reduce such a significant portion of the accident rate.

Much of our performance as pilots rests on our "Situational Awareness,"

our ability to keep track of a wide range of information and make good decisions based on that information. There is a trap waiting for us in attention management, however, because we can only pay attention to one thing at a time. When it seems that we are doing

areas of situational awareness become second nature. For example, a new student pilot spends considerable energy just trying to remember what attitude he is supposed to maintain, and most of us have experienced the embarrassment of thinking we had everything under control only to have the instructor point out more or less diplomatically that, while concentrating on pitch attitude, we let a wing drop. Sometime toward the end of the first lesson the instructor typically will ask where the airport is. Even though the practice area may only be a few miles from the airport, the student has been so busy just keeping the wings level and the nose the specified amount below the horizon that he typically has no idea where he is. By the next flight, the actual flying comes a little easier, and the student pilot is able to start keeping a basic idea of his geographical orientation.

Gradually, as we become more adept at the basic skills of flying, the instructor adds more responsibilities. We become aware of the location of other aircraft in the vicinity; we begin to keep track of the status of aircraft systems; and we can give a reasonable estimate of how long we have been flying. On

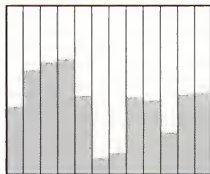
**ALMOST HALF OF ALL
ACCIDENTS HAPPEN
TO PILOTS WITH
LESS THAN 100
HOURS IN THE TYPE.**

two or more things at once, we are really switching back and forth between the tasks at a rapid rate. The problem comes when one particular task takes an inordinate amount of time and draws our attention away from other equally important areas.

During our training, as we study, practice and interact with other pilots, we gain knowledge, increase our skills, and hopefully develop a professional attitude. At the same time many of the

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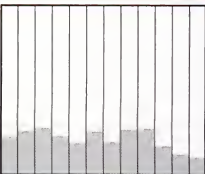
STUDENT STARTS

Flight crew hiring continued its decline through July, with even regional hiring, which had been a bright spot, substantially slowing down.

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our first cross-country flight we learn how to determine the present and forecast weather, and how to find out the status of airports and navigational aids. After becoming licensed pilots we add the responsibility for being aware of the status of our passengers, the maintenance of the aircraft and perhaps the status of other crewmembers.

If you were counting, we came up with a total of at least nine areas that the pilot is responsible for being aware of: attitude, position, traffic, systems,

time, weather, airports/navigational aids, passengers, maintenance and, possibly, crew. Good situational awareness consists of the accurate perception of these factors and conditions affecting the aircraft and crew, including what has gone on in the past in relation to what is going on now, and how all this may affect the future of the flight.

The problem is that as we gain experience and skill, we come to rely on our growing ability to maintain situational awareness without conscious effort.

We no longer consciously think about the attitude of the aircraft, we just put it where it is supposed to be. We don't have to think about how to operate aircraft avionics and other systems, we just do it. In fact, it is this ability that allows us to accomplish many of the more difficult tasks in flying, such as a night approach to minimums in turbulence. Any weakness in our skills increases our workload and stress level and reduces our capacity for keeping track of what is going on around us.

Yet that is exactly what happens when we check out in a new aircraft. All of a sudden our knowledge and skill levels take a plunge. Just keeping the aircraft on attitude and speed can be a chore. We must use conscious thought and effort to operate the aircraft systems. Sometimes something as simple as selecting the proper avionics can be a time-consuming chore. If the new aircraft is considerably faster than the one previously flown, our whole sense of time and position can be thrown off. We may also be operating in a new environment of pressurization and flight levels.

Unfortunately, our pilot egos don't like to admit that our abilities have taken a giant, if temporary, step backward. And these same egos, coupled with the rush to get someone on line and the desire to save money, will often lead to the "Halo Effect," which is a tendency to attribute unwarranted skill or expertise based on unrelated or faded experience. Basically we concentrate on the fact that someone had hundreds or even thousands of hours in other types of aircraft, and belittle the importance of a careful checkout. Or perhaps this individual has considerable time in this type of aircraft, but it was many years ago, and we expect him to be right up to speed in no time.

One example of the Halo Effect is the Beech Baron pilot who decided that he didn't need a checkout to fly a Cessna 421. After all, they were both piston-engine aircraft and certainly the pressurization system couldn't be too difficult to figure out. Of course, the engine control layout for Beech and Cessna aircraft are different, and after takeoff the pilot pulled back on the propeller control instead of the throttle. Distracted and confused because the manifold pressure was not decreasing as expected, the pilot allowed the aircraft to stall, after which it dove vertically into the ground, killing all four people on board. The reduction of power after takeoff, which was second nature to this pilot in the Baron, was such a distraction in the Cessna 421 that he couldn't even maintain the basic atti-

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tude and flying speed of the aircraft.

Another example of the Halo Effect occurred in 1983 when two pilots lost control of a Lear 24 in clear-air turbulence at Flight Level 450. Although the pilots had combined experience of over 15,000 hours, neither one had over 30 hours in the Lear 24. The captain had no other experience in turbine-powered aircraft, and had completed a two-day ground school on the Lear 24 followed by the check ride a week later. The copilot had considerable air-carrier turbine experience, but little on Learjets. After they encountered the turbulence and lost control of the aircraft, they extended the spoilers. Normally this might make sense, but in a Learjet the spoilers exert a strong nose-down pitch force, and their use in an out-of-control, overspeed situation only makes matters worse. The Lear 24 crashed, killing all on board.

Sometimes just a new piece of equipment can reduce our situational awareness enough to restrict our scan and allow other important information to go unnoticed. It is obvious that a new loran or EFIS would be distracting, but even the simplest item can have a deadly effect. In one case, a very experienced EMS helicopter pilot had a powerful searchlight installed on his helicopter. Since it was just a light that would help him see the landing zone better and would make it easier to spot any wires, he probably didn't spend too much time thinking about any negative impact it might have. That same night he responded to an accident scene in rain and fog. Shortly after takeoff from the crash site, he experienced vertigo from the new searchlight reflecting on the rain and fog, and crashed.

The lessons to be learned are obvious. No matter how much experience we have, we need a complete checkout before flying a new type of aircraft or using new equipment. If there is to be any acceleration of the training program, it must be based on careful consideration of the pilot's experience and capabilities. Anytime we are using new equipment, whether it is a different type of aircraft or just a new flight calculator, we need to take into consideration the negative effect this will have on our situational awareness, allowing more time and raising our weather minimums until the operation of the new equipment has become second nature and our knowledge and skills are back up to full strength. And any aircraft requiring two pilots needs at least one pilot with considerable experience, so we shouldn't consider sending a new captain out with a low-time copilot. □



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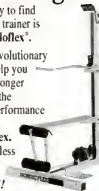
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TRAINING

COMAIR UPGRADES

BY NIGEL MOLL

The Comair Aviation Academy (CAA) was founded in October 1989, when the commuter airline of the same name bought the Airline Aviation Academy, founded four years earlier by

from six a.m. to 11:30 p.m. The air-planes have been flying 5,000 hours a month.

Michael Sullivan took over as president of CAA in April 1991. Sullivan had



Comair Aviation Academy president Michael Sullivan oversees 50 instructors, 66 aircraft and the progress of 250 or so students at the company's expanded Sanford facility near Orlando, Florida.

a Delta 767 captain. By buying AAC, Comair acquired a facility on Sanford Airport, about 20 miles northeast of Orlando, Florida, complete with a fleet of 24 Cessna 152s, five 172s, an Arrow and six Senecas.

It looked, too, as though the airline had bought into the training business at just the right time. From the outset CAA was selling flight training intended to put people in airliner cockpits, and it ran at a steady pace until March 1990. But then, along with many such schools, it experienced a strong upturn, and the Academy says it grew 400 percent in the next year. Things are somewhat quieter now, in terms of such explosive growth, but the Academy is still staying busy. The fleet now numbers 66 aircraft, including 36 Cessna 152s, which are kept flying by 66 mechanics who work in two shifts

been in aviation until 1985, working for TWA, United and Braniff in operations, before joining a plastics company and taking its sales to \$2.5 million a month from just \$25,000 a month.

Since taking over, Sullivan and his staff have spent 10,000 hours revamping the Academy's training methods, applying Comair-the-airline's methods to the fullest extent possible. The flight manuals for the Academy's fleet are being redesigned to follow the format of Comair's airliner manuals, and a building-block approach has been taken with the Academy curriculum. As far as possible, Sullivan wants to avoid force-feeding his students too much too soon, instead teaching them as much as they need to know for the stage they are at. On the other hand, CAA does try from the outset to steep its students in the sort of knowledge they will need

later as they are groomed for an airline cockpit, instead of forcing them to cram at the last stages.

Says Jim Pitts, director of air-carrrier training programs for CAA, "The commercial was mostly a rehash of what we all learned for the private. While still conforming with the FARs, we take commercial students beyond what is required, teaching them turboprop systems (the Brasilia) and high-altitude operations. We're qualifying pilots to earn a living in turbine aircraft. We use the same call-and-challenge checklist format in the 152s as the airline uses in its Brasilias. We do the same type of walk-around. We use checklists as *checklists*, not *do lists*, and they're designed on the flow principle."

The Academy's 50 or so instructors have deliberately been drawn from varied backgrounds; some came up through general aviation, and some are ex-airline heavy-iron instructors. Says Sullivan: "The instructors are our most important employees; the customers are the most important people here." At the time of this visit there were about 250 students enrolled at the Academy.

Ground work is conducted in six standardized classrooms and on six simulators—four single-engine ATC-710s (to be replaced by four Frasca 141s by year's end) and two multi-engine Frasca 142s. Sullivan is proud of his show-and-tell classrooms: They each have multiple projection screens and a drawing board, and the airplane-systems materials have been so designed that students can simultaneously see a photo of a component, study a schematic of how it works (on the screen and in their study guide), and examine a classroom prop of the part, be it a crankshaft or a piston/rod/cylinder/valve assembly or a constant-speed mechanism.

Comair fills some of its crew needs with CAA graduates, but not all. The airline had been planning on hiring 100 new pilots during fiscal 1993 (April 1992 to March 1993) but the fare war launched by American Airlines this summer has changed that and the number has "shrunk considerably," according to Sullivan. It remains to be seen how the current climate in airline marketing will affect long-term pilot hiring, but for the record, the FAA issued new-hire predictions in May this year (see next page).

Around the same time these estimates were published, Senator John McCain (R-Arizona), ranking member of the aviation subcommittee, warned that toward the end of this decade the

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airlines could no longer rely on filling 65 percent of their needs with ex-military pilots because of manpower and budget reductions in the armed services.

For pilots who already have experience but not the kind that is immediately palatable to airline personnel offices, Comair Aviation Academy has announced an Airline Qualification Course (AQC) centered around the EMB-120 Brasília. Minimum qualifications to enroll in the course are a commercial certificate, airplane multiengine land and instrument ratings, 1,200 hours total time and 200 hours multiengine. The course comes in two flavors. The first costs \$12,000, lasts six weeks and culminates in a Brasília type rating. It comprises four weeks of ground academics, one week of cockpit/simulator training and two flight periods in the aircraft (with Comair instructor-qualified line captains, and performed wherever an overnighting Comair aircraft is available in Florida).

Comair expects the second AQC course to generate more demand than the type-rating course. The first-officer course gets pilot hopefuls hooked up from the start with an airline participating in the program (FlightSafety offers a similar program). Says Pitts, "We

take résumés and screen them for our client airlines [at present two—Comair and Washington Dulles-based Atlantic

HIRING PREDICTIONS

In May 1992, the FAA issued the following predictions of how many new hires it anticipates by major and commuter airlines over the next 12 years.

YEAR	MAJORS	COMMUTERS
1992	1,228	2,716
1993	1,588	2,866
1994	2,880	2,844
1995	2,561	2,910
1996	2,452	2,850
1997	3,127	2,718
1998	3,686	2,775
1999	3,252	2,874
2000	2,974	2,890
2001	4,073	2,941
2002	3,354	3,013
2003	3,396	3,052

Coast Airlines—but expected to expand]. If the applicant meets the airlines' criteria, he or she then undergoes a flight screening and two-day technical-knowledge screening here at

Sanford." The fee for this is \$300. If all this screening is successfully passed, a background check is made, per FAA requirements, before the applicant is interviewed by the client airline. If that goes well, the applicant receives a letter of conditional employment and training begins. Atlantic Coast Airlines just gave letters of conditional employment to all 19 of the first 19 applicants put forward, according to Pitts, and they were due to start training in late August. The cost for the Brasília first-officer course is \$9,000, and the curriculum includes cockpit resources management, systems training, six periods in the simulator and some in the airplane itself, one of which is as pilot flying. Comair expects to offer similar courses for the Swearingen Metro and Saab 340 in the future as more airlines sign up.

Comair Aviation Academy's professional pilot course, which takes students from *ab initio* through ground instructor basic, advanced and instrument, and flight instructor single, multiengine and instrument to commercial multiengine and instrument, costs \$23,990 excluding accommodations. For enrollment details and more information on all of Comair Aviation Academy's courses, call 800/U-CAN-FLY. □

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EYE OF THE

EXAMINER

I have previously covered the subject of the nervous applicant with "check-itis," but there's another side of the coin. Once in a while I'll get to see an applicant who will attempt to intimidate the examiner.

This guy will start off with an air of extreme confidence as he lets the examiner know that he, the applicant, is indeed superpilot. Then it gets worse. He will voluntarily spout large quantities of erroneous "facts." He is "often wrong, but never in doubt." When he comes up with a wrong answer on the ground, he wants to argue with the examiner, and in the air if he blows a maneuver, he always has an excuse, or asserts he did it right, or "that's how my instructor taught me to do it." This

know-it-all individual may very well pass his flight test, but he's likely to be a hazard to himself and others once he's turned loose in the airspace. We've all seen this guy, while he's still a student pilot, hang around the FBO and tell the ATPs how to fly.

Quite a different type is the high-powered business or professional person who is used to giving orders to subordinates (and having them instantly obeyed). He shows absolutely no respect for his young instructor, and when check-ride time comes, he attempts to intimidate the examiner.

It is predictable with absolute certainty that unless both of these two types change their attitude we'll be reading about them and their aviation adventures in the paper one day. Sooner or later they're bound to get themselves into serious trouble. The lesson here for the young instructor is to be very firm with the first type; and as regards the second type, to force himself to realize (emotionally as well as intellectually) that in the field of aviation, the instructor is the expert. No matter that the student pilot has far surpassed the instructor in age, wealth and academic achievement (perhaps he's a doctor, attorney or college professor), but in aviation he's the neo-

phyte and the flight instructor is the pro. Once the instructor establishes this, both in his own mind and in the mind of the student, training can take place; but until this happens, there can be no learning (or effective teaching).

It is, of course, the instructor who must set the tone of the relationship that exists between himself and the student, just as the examiner must control the relationship between himself and the applicant. This teacher-pupil relationship has to be established immediately at the first meeting, or there are those who will attempt to bully the instructor into permitting them to determine the course of their training. The flight instructor must bear in mind that, in general, he is responsible for whatever his students do, and no one likes to assume responsibility for that over which he has no control.

It is the rare applicant who tries to play mind games with his examiner, but it does happen. The bottom line is, be honest and forthright with your examiner, and don't try to bluff him or argue with him. This doesn't mean that if you have a valid point to make you should stifle it, but rather that you should politely interject your point. It will no doubt be given the consideration it deserves.

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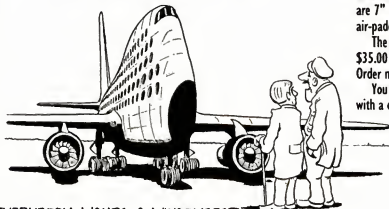
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AN INTERVIEW WITH... DONALD D. HARRINGTON, CEO

Q. Why has AMERICAN FLYERS prospered for 53 years?
A. Because our graduates have. We've consistently equipped them to be superior pilots whether they fly for fun or professionally. ...Nothing says more about an organization than a happy, successful customer.

Q. What's the secret of running a flight school that is bigger than most airlines?

A. Specialization. We don't let anything divert our attention from our students. We graduate more pilots than any school in the world, but our volume doesn't interfere with the basic formula for success... we won't allow any facility to get so busy that we can't provide personal service. That's why we have 12 locations and three divisions.

Q. Why three divisions?

A. In order to serve each student's unique objectives. Our Personal Aviation Division is dedicated to Private, Instrument and Recurrency training. It emphasizes practical education and is almost exclusively one-on-one instruction. The Professional Aviation Division concentrates on career preparation and is more academically structured. And for those who want a more in-depth education, we offer a college degree program.

Q. Do you offer accelerated courses?

A. Yes. You can finish the Instrument Rating in two weeks and the professional aviation "Academy" in four months.

Q. What's the advantage of a four month career course?

A. Time is of the essence. Our graduates are employed 18 to 36 months before anyone else.



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Q. What recommendations do you have regarding writtens?

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Q. What recommendations do you have regarding Instrument training?

A. Instrument flying is the most demanding pilot skill... it can't be learned by trial and error. The students that transfer to our school have an average of 20 instructional hours, but have never filed an IFR flight plan, never heard of the segments of the approach and have shot dozens of ILS approaches without completing any basic airwork first. Regrettably, the lack of qualified schools causes this. Much worse, many candidates quit, blaming themselves instead of the instruction.



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Q. How can you identify the good schools?

A. First, you must be convinced that "quality never costs as much as it saves." Learn with the best and you'll save time, money and regrets. Second, beware of the low cost guarantees that promise lots of licenses and hours, but neglect what's most important - an education. And avoid the unscrupulous schools that put two students in an aircraft and have them both logging flight time as pilot-in-command.

Q. What's your personal message to someone considering American Flyers?

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SPECIAL PHOTO REPORT

OSHKOSH 1992





OSHKOSH 1992



Arguably the most captivating sight in the sky above Oshkosh was Delmar Benjamin's faithful and brilliantly executed replica of the 1930s Granville Brothers Gee Bee R-2 racer.



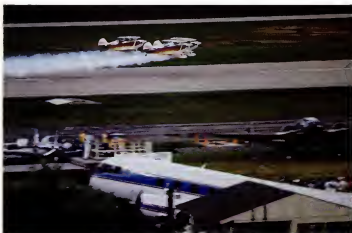
OSHKOSH 1992



Left: Heebie-Gee-Bees! This UFO (U for Unlikely) flies—and how, complete with show-ground-length knife-edge passes. Below: Three-man Eagles act is perennially polished. Bottom: Eight radials, six fins, two Connies.



RUSSELL HANSON



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OSHKOSH 1992



Above: The work of an owner is never done (Ryan STA).
Left: CAPers answer the call. Right: Wheel-chair visitors enjoy good access too.
Far right: Family that flies together stays together.





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OSHKOSH 1992



Showcases honored the Doolittle Raiders (sponsored by *Flying*) and their B-25s (above); the Tuskegee Airmen (right); and the 357th Fighter Group—the first to use P-51 Mustangs in the Eighth Air Force. Chuck Yeager belonged to the 357th, and that's him flying the P-51 shown here.





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HEART LAWRENCE

HEART LAWRENCE

Six of the 40 surviving Doolittle Raiders talked about their astonishing carrier-launched raid on Tokyo. Pilots clamored for autographs and details of the raid. The raiders attributed most to luck. Oshkosh pilots knew better.



HEART LAWRENCE

OSHKOSH 1992



Col. Joseph Manske



Col. Henry Potter



Col. William Bower



Maj. Gen. David Jones



Col. Travis Hoover



Brig. Gen. Richard Knobloch

Jim Robinson donated his Combat Jets collection to the EAA earlier this year. Among the nine aircraft are an F-86 Sabre and MiG-15 (right), remarkably similar in planform, and supersonic MiG-21 (below).



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Inspecting a Widgeon or a B-17 from every angle, and sharing the experience with someone special, can leave you footsore back at camp. Team effort rids Tiger Moth of the night's dew. Two Young Eagles get ride to remember with pilot Cliff Robertson.

OSHKOSH 1992

Opposite: What finer vantage point than the rooftop hatch of a DC-3? Enthusiast captures every intricate detail of a B-17 inside his video camera, while another phones home. As the show winds down and airplanes head home, leaving only grass shadows, the show takes on a quieter pace much enjoyed by those who stayed to the end.



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OSHKOSH 1992



WORLD AEROBATIC CHAMPION

Wind, rain and low clouds on Channel coast ground the world's best aerobatic pilots.

TEXT AND PHOTOGRAPHY
BY MIKE JERRAM

"Height penalty!" called the judge as the radically new but terminally unstable aerobatic ship tumbled clumsily out of a tailslide, dived out of view and hit the ground. We all laughed.

No catastrophe this. The ill-conceived dart-shaped airplane was made of a folded paper napkin, its designer/pilot safely seated at a lunch table in the food tent at Le Havre-Octeville Airport in France. Competitors, officials, judges, journalists and aerobatics groupies spent a lot of time in that tent during the 16th World Aerobatic Championships in July. An impromptu paper airplane contest was just one of the



Airplanes soaked in the mud during the World Aerobatic Championships, but the weather cleared for the smoky Breitling Masters contest.

SHIPS WASHOUT



many diversions we devised to fill each day, those of us who'd grown bored with old episodes of *The Avengers* (curiously entitled *Melon Hat and Leather Boots* in France) running on TV, or who couldn't bear to watch the endlessly rerun videos of past aerobatics contests in which the sun always seemed to be shin-



that the competition would enjoy the best of conditions. Alas, his optimism was to prove badly misplaced. That afternoon the Breitling Masters competition, sponsored by the famous chronograph manufacturer for 12 invited aerobatics maestros as an appetizer to the main event, had to be postponed. Rain.

Seventy-four pilots from



Some American pilots cling to their biplanes though high-tech monoplanes have gained the upper hand. Kermit Weeks (top) flew his *Solution*, Robert Armstrong competed in his *Pitts S-1C* (left) and Linda Gillmore flew her one-off *Machaik* (bottom).



ing, the skies mockingly blue.

You see, it rained a lot at Le Havre. The tented village housing teams and officials became a quagmire, three tons of hastily collected straw doing little to relieve the discomfort of calf-deep mud. The shoe stores of Le Havre ran out of rubber boots. I'd guess sellers of rain capes and umbrellas had an unseasonable run, too. The French movie director who made *Les Parapluies de Cherbourg* in the 1960s got his location wrong; he should have moved east along the coast of Normandy to this city at the mouth of the River Seine. Yes, it rained a lot at Le Havre, and when it wasn't raining the

wind was blowing beyond limits for competition flying, or the cloud above the cliff-top airfield was on the deck.

It hadn't augured well from day one. The parade of teams, and Fédération Internationale Aéronautique president Gerard Trocme's welcoming address, had to take place in a hangar to escape the rain. Trocme said he had no doubts

20 nations had gathered in France with the latest aerobatic hardware for WAC '92. The French, current holders of the Men's title from the 1990 championships in Switzerland, were strongly tipped by the home crowd. Along with the United States, they fielded the biggest team—five men, five women each.

The U.S. team had arrived in France two weeks before the contest was due to start to set up training camp just along the coast from Le Havre at St. Valéry-en-Caux, their airplanes flown across the Atlantic to a USAF base in Germany by C-5 Galaxy. Although monoplanes—CAPs, Extras and Sukhois—dominated the field, three out of the four biplanes competing were flown by U.S. pilots: Kermit Weeks in his potent, wickedly black *Solution*, Robert Armstrong in a Pitts S-1C and Linda Gillmore in her one-off *Machaik*. "Nope, it isn't a Pitts, never was a Pitts," she assured everyone who asked what variety of Curtis's classic this was.

The Russians, appearing for the first time at a World Championships since the breakup of the Soviet Union, fielded a smaller-than-usual team—three men and four women. Two familiar faces from former U.S.S.R. teams,



The airplanes to beat were (from left) the powerful Russian Su-26, the new French CAP-231 and the German Extra 300. The weather dumped on monoplanes, too.

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American pilot Linda Meyers had good weather to "hand fly" the Unknown Compulsory, but the rains washed out flying in this phase of the competition.

Jurgis Kairis and Sergei Boriak, were also competing, but under the flags of their native Lithuania and Kazakhstan, respectively, each thus qualifying for his own team tent and lawn chair in the village. To Western observers the distinction was less clear, since all the CIS pilots were flying red-starred Sukhois—Kairis bringing the hitherto unknown Su-29T prototype, while Boriak gave the two-seat Su-29 its international competition debut. "Political problems have reduced our numbers. The State doesn't help aerobatics anymore; we've had to look urgently for sponsors," explained team trainer Viktor Smolin.

A World Aerobatics Championship is made up of four programs. The Known Compulsory is published well in advance—practice all you want. The Free Program sequence is chosen individually by each pilot. The Unknown Compulsory is chosen from sequences submitted by each national team (the British submission was picked at WAC '92) and may not be practiced at all except for the "hand flying" ritual that you'll see aerobic contestants performing on the ground before they fly. The final Freestyle program is a four-minute anything-goes sequence that gives contestants a chance to unleash their aerial artistry and choreography free of the constraints of set figures.

The flying order is drawn by lots. No one wants to go first. For the Known Compul-

sory it fell to Patrick Paris, favored by the French to retain the Men's title for the host nation following the retirement from competition of current holder Claude "Co-Co"

Bessière. Paris wound up with plenty of time to contemplate his routine; it took four rainy days for the competitors to complete the 10-minute pre-contest

training flight that each is permitted. Its purpose is to let the pilots familiarize themselves with the area and the confines of the 1,000-meter-square cube of airspace that makes up the competition aerobatics "box."

A full seven rainy days had passed since the opening ceremony before the Known Compulsory program had been completed, with the Sukhoi-flying Russians dominating the men's class. Nikolai Timofeev topped the program, with Nikolai Nikitiuk, Jurgis Kairis and Alexandr Ljubarets close behind, just 47.5 points (out of more than 3,200) separating the top four. Avions Mudry test pilot Dominique Roland, flying the

AN EVEN MORE POWERFUL SUKHOI



Surprise of the World Aerobatic Championships was the appearance of the previously unannounced Sukhoi Su-29T (the T suffix comes from the Russian word for competition), flown by Sukhoi test pilot Jurgis Kairis. The Su-29T combines the wing, landing gear and lightweight composite monocoque rear fuselage of the two-seat Su-29 with a single-seat forward fuselage section and an experimental uprated Vedeneyev M-14PF radial engine; the M-14PF has a larger supercharger than the standard motor, raising power output to more than 400 hp. The engine in Kairis's airplane was said to have a TBO of just 50 hours, but similarly conservative estimates of engine life were given for the M-14Ps in early Su-26s, which are now cleared for 750 hours of punishing Unlimited-level aerobatics. The prototype flown at Le Havre, built as a design exercise by Sukhoi, had first flown only four weeks before the contest and had accumulated less than 20 hours in the air. As yet there is no word on plans to put it into series production.—M.J.

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new carbon-fiber-wing CAP-231EX, and favorite Paris followed, with top-scoring American Phil Knight in seventh place and veteran campaigner Kermit Weeks in ninth. U.S. team newcomer Bob Armstrong surprised many, coming in 17th in his seemingly outclassed two-aileron Pitts S-1C against a bevy of state-of-the-art CAPs and Extras. Among the women, Russia's Elena Klimovich came out tops, ahead of U.S. National Champion Patty Wagstaff and Russian teammate Svetlana Kabatskaya.

Belatedly, the scene was set for an interesting second program, launched (unlucky France again!) by Brigitte Delasalle. Fourteen pilots completed their Free sequences before it rained again. And again. And then some more. Each morning we trooped to the early briefing in boots, huddled beneath umbrellas. The men from Météo (weather briefers) tried to put a smiling face on the gloom—"Bring your sunglasses, go to work on your tans"—but it didn't fool anyone: If the rain didn't get you, the wind or low ceiling would.

In the food tent, 400 damp, dispirited pilots and officials filled the interminable hours between breakfast and lunch, lunch and dinner, dinner and departure of the buses for downtown accommodation as best they could, no one wanting to think the unthinkable: that the contest might end up being weathered off. The only aerobic flying taking place was by a bunch of guys with stunter kites, which were ideally suited to the blustery conditions. Maybe each of the WAC competitors should be given a kite, so they could duel it out on the ends of strings. Someone suggested that each pilot hand-fly his sequence, the best body language decid-

Phil Knight, flying an Extra 230, finished the best among the American pilots. None of it mattered because not enough events were flown to declare a champion.

ing who would be champion. Or maybe a precision-taxiing contest? "Too muddy for that," muttered one committed pessimist. It was true: They'd had to move some of the competition airplanes from their saturated grass tie-downs to the airport's transient ramp to save them from getting bogged down. Not that it mattered . . . no one was go-



Frenchman Xavier Delaparent (center) won the Breitling Masters. Jurgis Kairis of Lithuania (left) was second, and Russian Nikolai Timofeev finished third.

ing to fly. Someone sketched a new aerobatic ship, specially designed for conditions at Le Havre: It combined all the best elements of the Extra 300, CAP-231, Su-26 and Pitts . . . with floats.

More seriously, there was concern among some competitors that the long gaps between flights—some pilots hadn't been near a cockpit for eight days and didn't dare go aloft even when

the weather was flyable since any extra-curricular aviating, even as a passenger, is strictly forbidden under pain of instant disqualification during contests—might have an adverse effect on G-tolerance. Worse still, they couldn't even party at night just in case the weather changed and they had to fly next morning. Thus, on July 14—*Quatorze Juillet*, Bastille Day, France's annual celebration of the French Revolution, when no one goes to bed early—the cream of the world's aerobatic aces were tucked up in their cots while *tout* France erupted with fireworks and firecrackers.

By the end of the second Thursday, which should have been the penultimate day of the contest, only 26 of the 74 competitors had flown their Free sequence. To qualify as a World Contest a minimum of two programs must have been flown by everyone. Friday dawned . . . wet, again. At the morning briefing the International Jury said they'd be making an announcement at four p.m. The weather briefers weren't optimistic, but there was just a possibility that if they were wrong—as they had been too often—and the contest could spill over into Saturday, those

remaining 48 pilots might just get to fly, and a World Champion emerge.

The third, Unknown Compulsory program was irretrievably lost, but turning adversity to someone's advantage, Kermit Weeks took 10 francs off every pilot to run a sweepstakes on the order of the draw. Instead of leading off the

third round, the first name out of the hat would collect a purse (actually a mineral water bottle) filled with coins, a prize of around \$140. For once everyone wanted to go first. Phil Knight, best-scoring American from round one, scooped the pool.

His pleasure was short-lived. At four p.m. up stepped contest director Michel Dupont. "The weather wasn't with us," he declared superfluously. "It is my unpleasant duty to tell you that we have to terminate the World Aerobatic Championships."

It was a No-Contest—the first in the Championships' 32-year history. Co-Co

Bessière of France and Natalya Sergeeva of Russia retained their 1990 titles for another two years. No one believed Co-Co when he said he'd planned it all along this way, doing a little rain dance each morning to ensure his retirement didn't rob him of his World Champion status.

Nor were many competitors much consoled by Dupont's announcement that the postponed Breitling Masters would be flown on Saturday with an expanded field of the top pilots. "Prepare your 'flat' show because of expected low ceiling," advised the man from Méteo gloomily.

He was wrong. Ironically, with WAC '92 dead and some of the teams already departed, Saturday brought severe-clear weather to Le Havre. The Breitling Masters, which, unlike formal competition, permits pilots to use smoke and music during their free-style sequence, was spectacular, three solid hours of airplanes "doing things they didn't ought to be able to do," and which you can't describe (a friend thought Kairis's act resembled "an explosion in a boomerang factory," and I'm not going to attempt to better that).

The winner, the Master, was a 22-year-old Frenchman, Xavier Delapparent, who put on a lyrical display of pure magic in a CAP-231. Delapparent is a draftee in the French Air Force, assigned to its elite aerobatics school, which must beat pulling guard duty. Kairis came in second, to the great delight of the Lithuanian entourage, and Known Compulsory gold medalist Nikolai Timofeev placed third.

The post-mortem on the 1992 World Aerobatic Championships may rumble on for some time, fueled by the nagging doubt that it needn't have ended the way it did. The weather had severely wounded the contest from the outset, but not fatally, and it was hard to escape the conclusion that official indecision, overreliance on weather forecasts, time-wasting and delays (not least in stoppages of what little flying was able to take place for Le Havre-Octeville's daily handful of scheduled commuter flights) dealt the death blow when a more flexible approach might have saved it.

The 1994 World Aerobatic Championships are scheduled for Sarmellek, Hungary. I hope they've checked the weather patterns for that area. ☐

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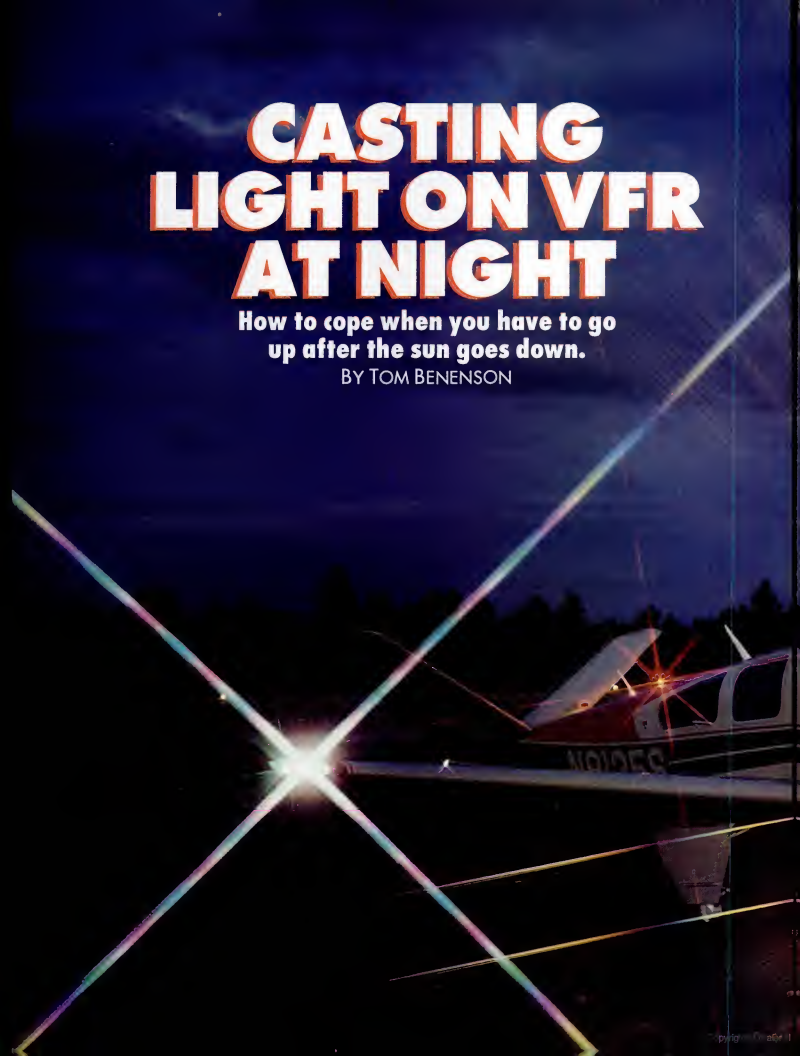
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CASTING LIGHT ON VFR AT NIGHT

How to cope when you have to go
up after the sun goes down.

BY TOM BENENSON





Pilots who fly at night do it in the dark. That's the problem with night flying. Otherwise, there's no better time to be going somewhere. The air is generally smoother, aircraft anticollision lights and airport beacons can usually be seen from a long way off, and the controllers have time to relax and be friendly and helpful.

"Where you headed?" I was asked by a controller late one night as I was returning home from Martha's Vineyard in a faithful but, that night, very slow Cessna 150.

"Columbia County."

"I show your groundspeed as only 75 knots. It's going to be a long trip. Are you

alone?"

"No, my wife's with me."

"At least you've got company."

"She's asleep."

"Oh. Well, have a good flight."

On a clear night it's easy to get complacent about where you are and where you're going. On that flight, when Judith woke up, I proudly pointed ahead. "See the lights? That's Hudson."

She studied the view for a moment and then shook her head. "Can't be. At two a.m. there wouldn't be that many lights in Hudson. That's gotta be Albany."

She was right. I corrected course 30 degrees to the left and was rewarded by the green-white, green-white, green-white of the airport beacon some 25 miles away.

"That's Hudson," I said pointing in the proper direction. "And that's the beacon right over our nose," I added confidently.

The FARs are pretty specific about night flying. According to FAR 61.107, a candidate for private pilot *must* have "logged instruction...in at least the following pilot operations....Night flying, including takeoffs, landings, and VFR navigation....In addition, his logbook must contain an endorsement by an authorized flight instructor who has found him competent to perform each of those operations safely as a private pilot" [FAR 61.107(a)(9)]. That requirement has nothing to do with whether the private pilot is actually accorded night-flying privileges.

To become a private pilot the candidate is required to have been coached in how to get around safely after the sun has gone down. To not be restricted to daylight hours, the private pilot candidate must *also* have logged a total of three hours of night flying and made at least 10 takeoffs and landings at night [FAR 61.109(a)(2)].

Night is defined several ways. Officially, it's the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time. Hours flown during that period can be logged as nighttime for the purpose of meeting aeronautical experience requirements for various certificates, but not for staying current to carry passengers. The

recent-experience requirements state that a pilot is not permitted to carry passengers "during the period beginning one hour after sunset and ending one hour before sunrise (as published in the American Air Almanac) unless, within the preceding 90 days, he has made at least three takeoffs and three landings to a full stop during that period in the category and class of aircraft to be used" [FAR 61.57(d)].

There was a time when a student pilot could get his license without ever

throughout the retina. Rods, on the other hand, are very slow to react, provide no color, and are located on the edges of the retina.

There are two blind spots in the eye. One exists all the time, the other only at night. The first is located at the point where the optic nerve attaches to the eye. We normally aren't aware of it because the brain cleverly fills in with whatever background detail it sees around the spot. The second blind spot occurs at night and results from the

THE NUMBER OF NIGHT-TIME ACCIDENTS IS STILL OUT OF PROPORTION TO THE NUMBER OF HOURS PILOTS FLY AT NIGHT.

having had any introduction to—let alone instruction in—night flying, and launch into a coal-black night with a plenitude of unsuspecting passengers. Then nighttime accident statistics raised their bloody heads; the FAA prudently added the night-training endorsement and the restricted certificate for those pilots who don't complete the minimum number of hours and takeoffs and landings.

The number of nighttime accidents is still out of proportion to the number of hours pilots fly at night. It's the difference between day and night. We simply just don't see as well in the dark as we do in daylight. The medical experts point to the physical construction of the eye to explain why our night vision is limited. There are two types of receptors—cones and rods—in the retina, at the back of the eye, where images are focused after passing through the eye's lens. The cones are activated when the light is the equivalent of moonlight or greater. The rods, being much more sensitive, come into play in lower light levels, typically defined as "starlight or less." The cones are faster-acting, provide color differentiation and depth perception, and are located

lack of rods directly at the back of the eye. The blind spot can obscure a golf ball at a distance of three feet and a DC-9 at about five miles. That makes a good argument for using peripheral vision and being particularly conscientious about keeping a good scan going at night.

The eyes can play other tricks on unsuspecting pilots. If you stare at a single light source against a dark background, the light will appear to move. This autokinetic phenomenon, as it's called, can cause you to take evasive action when you suddenly mistake a "moving" stationary light for another airplane. Night myopia is still another characteristic of the eye that can cause problems at night. If the horizon is void of visual clues, the lens of the eye will relax and focus at a distance of only three to six feet in front of the eye, making it difficult to see objects far away. To prevent night myopia, simply look for light sources in the distance and keep your scan going.

Before you go out and fly at night, there's one other phenomenon of the eyes that is important to understand. It's called dark adaptation. Turn off the light in a dark room and it takes a long

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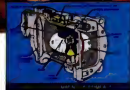


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while before your eyes adjust and you can make out shapes and shades of gray. Now turn the light back on; after a much shorter time, your eyes adjust to the increased light. Cones react quickly; rods react slowly. Dark adaptation can take from 30 to 45 minutes depending on a pilot's age and whether he smokes. If you know you're going to be flying at night, wearing sunglasses during the day helps shorten the time required for dark adaptation.

Night vision also deteriorates with the decrease in oxygen resulting from an increase in altitude. At an altitude of 4,000 feet you lose approximately five percent of your night vision; at 6,000 feet you lose 20 percent. Smokers, because their blood's ability to carry oxygen has been reduced, can lose as much as 40 percent of their night vision at 6,000 feet.

Once you've adapted to the dark, your night vision can quickly be obliterated by exposure to a bright light. Then the long adaptation period is again required to regain what little ability you have to see in the dark. If you need to use a bright light or can anticipate being exposed to one, close one eye. That way you'll be able to keep at least that one eye adapted to the dark.

Using red lighting in the cockpit or covering a flashlight lens with a red filter will help maintain your night vision, but the use of red lights isn't as critical as was once believed. What's important is that the light be as dim as possible. If you are using red lights, don't use a red pen or marker for notes or to mark your course on the sectional, since the ink will be virtually invisible in red light. The red lighting makes the magenta markings on sectionals disappear as though they were printed with invisible ink.

The first time I had a hint that I would soon need reading glasses came during a night flight. No matter where I held the chart, I couldn't quite get the letters in focus. Turns out that red light focuses farther back on the retina, so the signs of impending vision problems very often first show up when you try to read a chart in red cockpit lighting.

Even in the dark, some things are obvious. A proper preflight is impossible to perform without adequate light. Have a flashlight with fresh batteries for the preflight. A second, smaller flashlight should also be available. If

the panel suddenly goes dark, you can clip a small flashlight to the visor of your hat or, if necessary, hold it in your teeth and have both hands free. (You'll find that a flashlight powered by D cells can be quite a mouthful.)

At night, altitude above and runway behind are joined in the "useless" category by a flashlight on the back seat. In a recent accident, the pilot of a Cessna Skymaster was on a 20-mile IFR flight from a satellite airport to Green Bay, Wisconsin. Shortly after taking off, the pilot radioed the controller, "I have no lights." "Are you declaring an emergency?" the controller asked. "No. Not at this time." Five minutes later the Skymaster crashed. When investigators got to the wreckage they found a D-cell flashlight on the seat behind the pilot.

I've put patches of Velcro all over the inside of my Cardinal and glued complementary pieces to several flashlights, markers, a ruler, and a time-speed-distance calculator. When I need something I know right where it is—assuming I put it back in its place. A well-organized cockpit with a place for everything and everything in its place makes especially good sense at night.

Cross-country planning is different for a flight at night than for one when you can see where you're going. Navigation is going to be more challenging, since most visual checkpoints lose their value at night—unless, of course, they're lighted. Then they often make even better checkpoints than they do during the day. Towers with obstruction lights, large highways, airports with their rotating beacons and lighted runways, and the shape of towns and cities are all good nighttime reference points. Use everything you have in the cockpit to keep track of where you are. NDBs and VORs are helpful but shouldn't be depended on without a backup. The receiver in the airplane or the VOR station on the ground could go out of service, leaving a pilot who relied on them literally in the dark.

Your nighttime course should bend and twist to keep you near or over friendly territory and airports. Be aware of which way the wind is blowing, so that if you do need to make an emergency landing, you can turn into it to land with as slow a groundspeed as



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possible. Also remember that it's difficult to see power lines over highways, and that large unlighted patches in metropolitan areas may be lakes or ponds and not football fields. If necessary, letting the plane settle into the dark terrain in a nose-up, full-flap controlled glide is always better than losing control of the airplane. As in any situation, fly the airplane first.

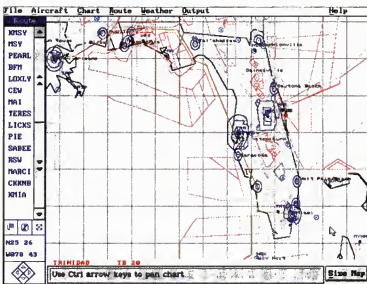
Plan to fly high. Radio reception is better, pilotage will be easier, you'll have that much more clearance above obstructions, and in case it's necessary you'll have a better chance of reaching a safe landing site. Check the grids on the sectional to determine the altitude that will get you comfortably over anything that might sneak up on you in the dark. IFR charts with the minimum obstruction clearance altitudes (MOCAs) and minimum reception altitudes (MRAs) indicated along the airways are an excellent way to determine safe cruising altitudes.

Study the legend panel on your sectional and then study the sectional. A lot of good information is depicted there, and some of it is particularly helpful for plotting a course for a night flight. Obstructions with high-intensity lights (strobes) are charted, as are other flashing lights. There are also symbols to indicate whether an airport has a rotating beacon and runway lights, and whether the lights are pilot-controlled. When you study the sectional you'll notice that many airports that have pilot-controlled lighting don't have rotating beacons. As you fly cross-country, you can use the pilot-controlled lighting to light up the airports ahead of you. They make great checkpoints and if you need to land at one, there'll already be a "light in the window" for you.

Before you attempt to activate the lighting system at an airport, announce your intentions on unicom; you could be playing dueling transmitters with another pilot and end up turning the lights off rather than on. After keying your microphone, give the system time to respond before keying again. If you don't, you may be turning the lights on and off yourself.

The FARs acknowledge there's a difference between day and night flying by requiring VFR pilots to have 45 minutes' fuel reserve at night compared to 30 minutes' during the day. I

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don't know about you, but if I'm lost, 15 minutes isn't going to seem like much time to get things sorted out. Plan to have plenty of fuel in the tanks when you arrive in the area of your destination. If you arrive at your destination airport unaware that it doesn't have a beacon and that the lights are pilot-controlled, you'll probably stumble around in the dark and dip anxiously into your inadequate 45-minute fuel reserve before you can find it. Check the sectional for pilot-controlled lighting, and if you have any questions, call ahead.

It's probably a good idea to call ahead anyway. That way you can find out the airport's hours of operation, when fuel is available, and other helpful hints known to the locals but not available on the sectional or in airport directories. It can make for a long night to arrive at an airport after dark only to discover that everyone at the FBO has gone home.

In many ways a night flight—particularly over areas with few lights on the ground—is an instrument flight. It can be very difficult on a dark night to distinguish where the earth ends and the sky begins. The ability to fly by reference to the instruments is virtually essential. In the dark it's easy to inadvertently fly into a cloud. Often the only way you can tell you have is that the lights on the ground ahead disappear. Be at least capable of comfortably executing a 180-degree turn on instruments.

Landings really separate night from day. Normally as you descend in your approach, you subconsciously judge your height above the ground by your motion relative to objects on the ground and the shape of the runway. When your visual references are reduced at night, the appearance of the runway lights becomes much more significant. But they can be deceiving. Brighter lights appear closer than dim lights. So if there's fog or haze, or the windscreen is dirty, the runway will appear farther away than it is. If the runway is wider than you're used to, or if the runway lights are far from the actual edge of the pavement, your flight path will appear lower than it actually is. And if you're landing on a runway with an upslope, you'll have the illusion that you're higher than you really are. If the runway is

equipped with a VASI, PAPI or PLASI system that provides a visual approach slope indicator, follow it to a safe approach.

The night landing itself can be complicated by a kind of tunnel vision. The landing light carves a nice bright path through the dark and there's a tendency to follow it right to the ground and to forget to flare. The result is a rather emphatic arrival with a pretty good bump on the nosewheel. Or, the beam of the landing light may make the runway appear to be rushing up, causing you to flare too high. Remind yourself not to fixate on what appears in the "center stage" of the spotlight, but to look ahead of the airplane and use the runway-edge lights to judge your height. Some pilots actually find it easier to make reasonably smooth landings when they're practicing without a landing light.

Once you're on the ground, getting around the airport can be much more difficult than finding it. If you're at all unsure of where you are on the airport or where you're supposed to go, ask. Request a progressive taxi clearance and let the controller hold your hand. He'd much rather have you do that than blunder around in the dark. A friend of mine, flying a Panther Navajo, called New York's Kennedy Airport Ground Control and said, emphasizing his heavy Southern accent, "Ah'm not from 'round here and ah'd like to get outta your way as quick as ah can, so if y'all just tell me where to turn ah'd be much obliged." The controller patiently guided us through all the turns right to the active runway.

It's hard to stay current at night while maintaining a semblance of normal home life, particularly in the summer when the one-hour-after-sunset rule means it's normally well after dinner time before you can legally log the takeoffs and landings. Nevertheless, it's important to keep your skills sharp and your perceptions practiced. Get some dual and then try to plan some short cross-country dinner flights. Take two cars to the airport so your spouse can get along home while you do a couple of extra landings and button up the plane without a lot of pressure to hurry. If you prepare properly, there's no reason why you should be afraid of the dark—or ever go bump in the night. □



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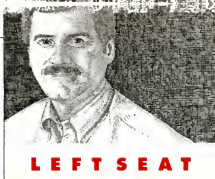
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LEFT SEAT

B Y J. M A C M C C L E L L A N

IFR TO OSHKOSH

People kept asking me when I was leaving for Oshkosh. At 9:20 a.m. on Thursday, I told them; 1320 Zulu, if you prefer. Others phrased the question in terms of my arrival. Twelve-thirty p.m. Central Daylight Time, I said; 1730 Zulu, if you prefer.

"Oh, you're flying out on the airlines," somebody said, unaccustomed to hearing me speak in such schedule specifics. Nope. Just flying IFR into Oshkosh. My arrival slot time was 1730 Z.

I love flying to Oshkosh. The show is spectacular, of course. But the flight into what is temporarily the world's busiest airport is just plain fun. I've flown in every year since 1975, arriving that year in my Cessna 140. I've filed IFR for the last 10 years because I just couldn't take a chance on being late if the weather went down.

Arriving IFR adds a dash of spice because you must plan the flight to the minute without aid of a winds-alot forecast. When you call Chicago Center to reserve your IFR arrival slot 48 hours in advance, you must specify your departure airport and time en route. Center warns that extensive delays are likely if you arrive more than five minutes before, or 15 minutes after, your slot time. The being-early part is pretty easy to manage; I know how to make an airplane go slow. Being late is the threat.

I often brag that I can flight-plan with plus or minus 10 minutes accuracy using nothing more than a wall planning chart and a calendar. I step off the distance on the chart with my fingers and check the calendar to remind myself of the season in order to estimate the headwind. I never plan for tailwinds, no matter which direction I'm headed; they're too fickle. Headwinds are dependable.

From May to early October I count on 20 knots' groundspeed loss for any trip with an average course between 130 and 50 degrees. For the rest of the year I increase the headwind component to 35 knots. I plan for a headwind

even when flying northeast or southeast because crosswinds contain a headwind component. It's not uncommon to be flying northeast, for example, and be slowed to a crawl by a fierce northwesterly wind, particularly in the winter.

Combining the summer headwind of 20 knots with the anything-but-direct

**I OFTEN BRAG THAT I
CAN FLIGHT-PLAN
WITH A WALL CHART
AND A CALENDAR.**

routing distance I expected between Westchester County Airport in New York and Oshkosh gave me an estimated 4+10 time en route. That meant I should be wheels up at 9:20 local time. I filed for 9:10, a 10-minute pad.

Dropped the kids at sailing school, loaded the airplane with eight days' worth of clothes for Oshkosh conditions ranging from 90° sunshine to 60° rain, and called for the clearance at nine, straight up. The controllers came right back with the clearance—something fairly unusual for this part of the world—and the routing actually resembled what I had filed. Ground control said we were number five for departure. The weather was VFR with a 7,000-foot overcast. No problem. Wrong; it took 25 minutes to launch five airplanes on a VFR day. That's New York. That's already used my 10-minute pad and put me more than five minutes behind.

My wife, Stancie, finished punching the 18 legs of our IFR route into the Bendix/King KLN 88 loran just as we leveled off at 9,000 feet. I know, that's the wrong altitude for direction, but we were in New York Center airspace. The KLN 88 assembled the entire route and said we needed four hours and 38 minutes to get to Oshkosh at

present groundspeed. The headwind was nearly double my estimate. It was 10 knots stronger than the FD forecast I got out of my computer earlier in the morning. The calendar and the controllers had apparently let me down.

As we flew over, under and through clouds and light rainshowers, the controllers assigned us every altitude between 6,000 and 12,000. I wanted to stay at six, hoping for less headwind. It didn't matter. Groundspeed was within a knot or two of the same at 12,000 feet. After two hours the KLN 88 still had us arriving at Oshkosh more than 15 minutes late. I've never been late. I didn't know what kind of reception to expect.

Crossing southern Lake Huron into Michigan, the wind eased up. By the time we reached the eastern shore of Lake Michigan the headwind was gone and we were making our true airspeed of 190 knots over the ground. When Chicago Center sent me down from 12,000 to seven, I picked up five knots of tailwind. The KLN 88 said we would be over Oshkosh only five minutes late, well within the 15-minute window. The calendar had come through after all.

For the first time I would fly the VOR 9 approach into Oshkosh. Every other year it had been the VOR 27 or ILS to 36. I was vectored south of the airport on a wide right downwind at 7,000 feet. The frequency was about half as crowded as on a VFR weekend day at Westchester. The Chicago Center controller who handles IFR flights was unharried, and pilots on the frequency all sounded competent and alert. The war stories about ATC chaos over Oshkosh simply aren't true.

About 12 miles west of the airport I was vectored onto base leg, descended in steps to 3,000, and given several different speed assignments. Intercepting the final approach course inbound, I was assigned 120 knots to the runway and the Caravan behind me was given the same speed.

The VFR arrivals were flying in under us on their way up from Fisk, a small town that serves as the VFR ar-

rival gate. The tower controller was talking almost continuously to the VFR pilots, not asking for, or waiting for, replies. He had my flight strip, called me and told me to rock my wings before I had a chance to key the mike. Stancie complained about my plus/minus 40-degree wing rocking, even though I reminded her that the notam instructs all pilots to rock their wings vigorously when controllers ask.

The tower pointed out a Bonanza to follow. I matched our speeds and made a good landing, turning off on the pavement instead of the grass as airplanes were farther down the runway.

Later in the show Cessna chairman Russ Meyer regaled me with stories about the number of phone calls needed to get his IFR slot into Oshkosh, but he found on arrival that ATC procedures were virtually routine. A guy in a Bonanza in front of Meyer had gotten a little too close to the airplane he was following and was sent around. Other than that, it was an ordinary VOR approach for Meyer in the Citation. He had been expecting some un-

HE TOLD ME TO ROCK MY WINGS BEFORE I HAD A CHANCE TO KEY THE MIKE.

usual ATC procedures and was pleasantly amazed by the Oshkosh routine.

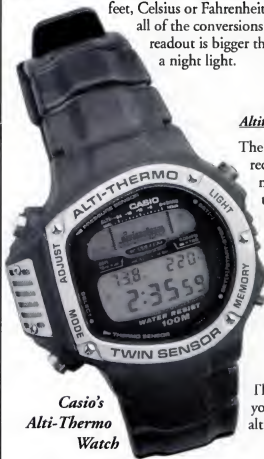
There's nothing ordinary about landing at an airport with 10,000 airplanes tied down on it, but flying into Oshkosh is not the daredevil stunt that hangar fliers make it out to be. The biggest thrill for me is planning the flight more than two days in advance and then trying to stay on schedule.

The wonder of flying into Oshkosh was replaced with the usual jerking around on the way back into Westchester. Let's see; I was asked to increase my rate of descent out of 5,000 feet when it was already at 1,700 fpm. We were number eight for the airport. Two airplanes ahead were sent around. Seven jets waited for takeoff while the pistons queued up on the cross runway. The approach controller told me he didn't know what the tower was up to, but it seemed to be all screwed up. As I tied down my Baron, a G-IV was sent around while a Falcon sat on the runway waiting for a string of airplanes to cross. I wished the rest of the world worked like Oshkosh. □

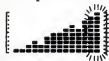
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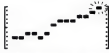
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It may be a mnemonic hallucination, but I seem to recall Cessna ads of many years back asking, "Did you ever see a low-wing bird?"

That was an *ad hominem* argument if ever there was one. You never saw a bird with wheels either. And you never saw an airplane with feathers, or, for that matter, even a high-wing Cessna twin. But the low-wing-bird argument reliably cropped up every time someone wanted to discuss the relative merits of high and low wings.

There were plenty of other arguments for high wings too. They purportedly make an airplane more stable. They have less drag. Fuel flows out of them without the assistance of a pump. They let you see the ground. They shelter you when it rains. They make it easier to get in and out.

All true. All vain against the classic counterargument: *Did you ever see a high-wing fighter? Huh?* We're talking about World War II fighters here, of course. Plenty of jet fighters have high wings, and all kinds of other weird features. But they don't count, because they're so little like light airplanes. If you want to know how airplanes ought to look, you go back to World War II, right? Mustang, Spitfire, Focke-Wulf 190, Thunderbolt—those were the airplanes that defined the classic proportions: Theirs was the Golden Age.

Of course, that still doesn't explain why most of the personal airplanes sold since the dawn of history (I think this must be true) have had high wings.

The idea of the cantilever monoplane has been around since the 1920s; remember the corrugated Ford Trimotor and its Junkers doppelgänger? For that matter, the DC-3 was a 1920s design. But the evolution of light aircraft detoured around cantilever wings, going from biplanes to strut-braced monoplanes. The reasons had a lot to do with materials: Wood, steel tubing and fabric, the conventional stuff of small airplanes at the time, didn't lend themselves as well to cantilever construction as metal monocoque does.

Given the materials and the size of the airplanes and engines, it was possible to build a lighter, and therefore a better-performing, airplane with a strut-braced wing.

The strut-braced wing is a cantilever from the strut attachment outward, but inboard of that, it's a triangular truss, very stiff and very light. The inboard portion of the main spar carries compression rather than bending, and it can taper down to a single small bolt at the root. The weight of that bolt and its surrounding structure is as much less than that required for a cantilever wing as the fuselage is deeper than the main spar. The strut wants to carry its principal loads in tension—it has to be bigger and heavier if it is to withstand large compressive loads—and it's in tension when the wing is on top of the fuselage. In fact, if there were no possibility of inverted loadings, and no need to park the airplane from time to time, the struts of high-wing planes could be wires rather than tubes.

Planes have been built with low wings braced by compression struts—a hideous arrangement—and with low- and mid-wings braced by wires above and below. The wire-braced designs are the lightest of all, but they're aerodynamically nauseous.

Wings can be put just about anywhere. Parasol wings were once popular: They resembled the top half of a biplane, with the wing sitting above the fuselage on stilts. (Of course, you can think of a high-wing Cessna or a Cub as a parasol-wing airplane with windows surrounding the stilts.) The Catalina had a parasol wing with a fat pylon instead of struts—something like the free-flight models of years gone by.

High-wing airplanes with pressurized fuselages usually place the wing in a fairing above the cylindrical pressure vessel, so that the nice clean tensile loads in the skin of the pressure cabin aren't interrupted by the wing structure. Unpressurized airplanes have more freedom; many use a so-called "shoulder wing"—the term seems to

apply to any airplane whose fuselage contour emerges, however slightly, above the upper surface of its wing.

Conversely, pressurized low-wing airplanes sometimes put the wing entirely below the pressure vessel (a practice that was most visibly obvious in the British D.H.125 business jet), but more often they content themselves with keeping the wing below the floor.

There is no terminology for low wings that enter the fuselage a bit above the bottom. What shall we call them? Hip wings? Whatever they are, the Beech Starship has them.

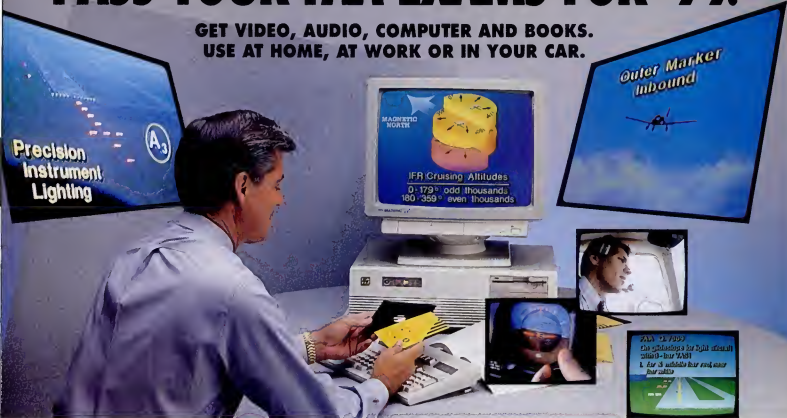
When Ted Smith designed the Aero-star, he opted for a mid-wing configuration. Although a few oft-cited studies of wing position indicated that the mid-wing arrangement produced the least interference drag between wing and fuselage, that wasn't what motivated Smith. The real fact was—though Aero-star salesmen would never admit it—that nobody else had a mid wing.

The difficulty with a mid wing—in fact, with almost any wing—is that it compromises the space in the cabin. Smith somehow managed to get the main spar back to the rear cabin bulkhead; I suspect his choice of thick-skin stringerless construction in the tail-cone was influenced by the inherent nose-heaviness of his design. Tandem-wing airplanes finesse this problem of the wing invading the cabin; the two wings, or wing and canard, carry the body between them, like a patient on a stretcher. The Piaggio Avanti employs a small forward wing to carry some of the cabin load, allowing the mid-mounted main wing to be placed unusually far aft.

The terminology surrounding wing position is misleading. Because we occupy the fuselage, we think of a plane as a fuselage with a wing attached to it. You see this when people talk about the wing "falling off." What really happens (when it happens) is that the fuselage falls off the wing. The airplane is a wing, not a fuselage; and so a high-wing airplane is really not a high-wing, but a

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low-fuselage. This is important, because the aerodynamic arguments for putting the fuselage here or there have to do with preserving the efficiency of the wing, not that of the fuselage.

If you ignored the struts connecting it to the fuselage, the parasol wing was arguably the most efficient arrangement; the wing was complete, and generated lift undisturbed along its entire span. Look at the wing-mounted engine nacelles of jet airliners: They're set below and clear of the wing in order to

minimize the interference between the wing and the nacelle. If it weren't for the inconvenient existence of the ground, they'd be farther from the wing than they are.

But a parasol wing is not an option for high-speed aircraft for obvious reasons. Once you splice the wing and the fuselage (or the wing and an engine nacelle), you destroy the wing as an airfoil over the embedded portion of its span. The problem then is how to undo the damage you've done.

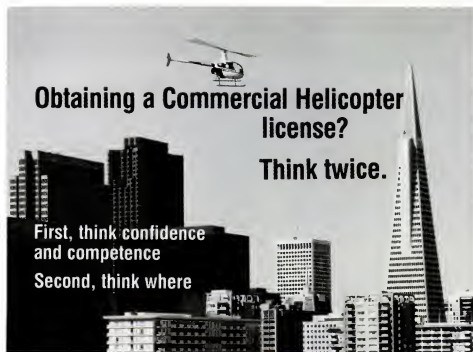
It turns out that a low body has a better natural interaction with a wing than a high body does. The reason for this is intuitively clear: The airflow around a wing takes the form of a curved sheet, rising to meet the leading edge, following the surface, and then spilling downward from the trailing edge. This flow more nearly matches the contours of a streamlined body placed below the wing.

Nevertheless, you can fiddle with the intersection and reduce the interference effects of a high-body arrangement to the point where there is no practical difference between high and low wings. The trick is to reduce the wing downwash in the vicinity of the fuselage so that it does not conflict with the upwash along the bottom of the fuselage. To do this successfully with a round fuselage and a low wing is particularly difficult. Fairings, which come in a huge variety of shapes, boil down to a couple of basic forms: either the wing trailing edge is reflexed upward to align the airflow with the fuselage, or a "tub" of some sort is added to the fuselage around the trailing edge to make the round fuselage bottom more square. Some designs avoid the need for a tub by making the fuselage bottom square to start with; the Bonanza and Glasair are good examples.

It's obvious that wing position is not, in the end, a critical variable in design; high-wing and low-wing airplanes perform similarly. Practical considerations, it seems to me, weigh in favor of low wings for light aircraft. The structural engineer finds it easier to mount landing gear on a low wing, and to secure the wing to a part of the fuselage that is not thoroughly perforated by windows. The pilot finds it easier to add fuel and to inspect it before flight.

The low wing's obstruction of downward visibility is a concern for passengers; for pilots, on the other hand, the low wing provides superior visibility while maneuvering. Some designs employ a mildly swept-forward wing to enhance the pilot's visibility in either case. Cargo and passenger loading, on the other hand, is certainly easier with a low fuselage, and utility aircraft commonly use a low fuselage to keep the wings above obstructions.

It's true that you've never seen a low-wing bird. But the reason has little to do with airplanes. Muscles pull, not push. The large pectoral muscles have to flap their wings have to be *below* the wings in order to pull them downward against body weight. That's all there is to it. No message from Mother Nature to airplane designers after all. □



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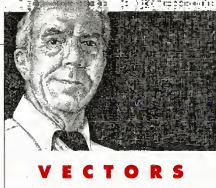
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EVACUATE

B Y L E N M O R G A N

On rare occasions it becomes imperative for everyone aboard an airliner to get out fast and run for their lives. These situations often occur with no warning. Such was the case when TWA Flight 843 aborted takeoff at New York's Kennedy Airport last July. Instead of routinely lifting for its run to San Francisco, the Lockheed L-1011 slued off the runway and burst into flames. The 292 souls on board escaped without a single fatality or serious injury.

"Talk about luck!" said a friend who regularly travels by air. In fact, luck had little to do with it. It was the superb response of Capt. William Kinkead and his crew that led to the happy ending. They pulled off an emergency evacuation right by the book. By the time the first fireman reached the scene, everyone was safely off the jumbo.

Laymen have little idea of the training crewmembers receive in dealing with ground emergencies. Much has been written about safety during flight. Every passenger with the least knowledge of aviation knows that an airliner can continue flying with an engine shut down even if it fails on takeoff, and that its airframe can withstand stress far in excess of anything normally experienced.

He's read about the "fail-safe" philosophy that underlies all aircraft design. He knows there are more ways than one to extend the landing gear, lower the flaps, put out a fire and find the runway in bad weather, and that the crew has been trained to cope with virtually any problem encountered aloft.

But he is less aware of safety precautions taken for surface problems. There are unpleasant possibilities during this phase of air travel—diversions from smooth runways to rough ground, smoke in the cabin, a fire or explosion in an under-floor cargo bin, collisions with buildings, vehicles or other aircraft and so on.

The chance that a crewmember, much less an occasional rider, will ever need to evacuate is exceedingly re-

mote, but the chance remains and is squarely addressed by builders and operators. Clearly marked emergency exits are the most obvious safety features. Loss of normal electrical power in a ground accident activates battery-powered lights over all exits and illuminates the aisles. Out of sight are escape slides and ropes, hand fire extinguishers, megaphones and, on overwater runs, life preservers and rafts.

While the copilot or flight engineer of an originating trip is inspecting the aircraft's exterior, flight attendants are ensuring that all cabin emergency equipment is in operating condition and properly stowed. An FAA inspector may appear unannounced to observe these preflight checks and quiz attendants about evacuation procedures. Faulty equipment or hesitant answers can cost an airline a stiff fine.

The thinking air traveler pays attention to the flight attendant's safety spiel no matter how many times he's heard it, and notes the nearest exits on both sides of the cabin. Should there be a fire, it could be on his side. After a half-century of flying, I still scan the seat-pocket card that tells how to get those exits open. The regular reviewing of emergency procedures that keeps pilots alive is no less prudent for passengers, whether the airplane has four seats or 400.

In the airline ground schools I attended, the first week was spent acquainting us with what the new type should do, and the last two exploring all the mean things it could do, not only in flight but on the ground. Hours were spent in the cabin learning the location of fire extinguishers, megaphones, walk-around oxygen bottles, inspection ports and first-aid kits.

We opened emergency exits, slid down escape ropes and doused gasoline fires. We memorized the evacuation checklist that included dropping the flaps so people scrambling out overwing exits could slide off the trailing edge with minimum chance of injury. There were movies of escape slide de-

ployment and a detailed discussion of what had been learned from actual emergency evacuation. A rating ride of ten began with a guided tour of the interior while a federal inspector asked questions.

Our cabin crewmembers got the same no-nonsense training. It remains a popular misconception that flight attendants spend their time learning to warm baby bottles and build martinis. It is a shame that reporters are not invited to join their classes and learn the facts, but airlines win at any suggestion that in rare instances their customers must leave the airplane less casually than they boarded.

When an airline acquires a new type of airplane it must demonstrate that it can evacuate everyone on board safely and rapidly. It was my good luck to participate in such a demonstration and see firsthand how modern safety devices work. In 1970 we took delivery of a 747. I gave up my 707 captaincy and bid a copilot slot, which shows how fascinated I was with the giant.

When our ship was ready, I was among two crews sent to Seattle for the evacuation test. The FAA allowed two minutes to completely vacate the airplane when all 365 seats were filled. This was modified for the test: our procedure would be approved if we could get 90 passengers and ourselves out of the plane in 30 seconds. The "passengers" were recruited through a newspaper ad; men and women of all ages were selected. None could be an employee of Boeing or any airline and none was told what the job would be.

We crewmembers were assembled for briefing. It is possible that you will fail on the first try, they said, which is why your line has sent two crews. Each demonstration had to be conducted by a "green" crew and 90 uninformed passengers. One of the major lines had needed two attempts to qualify, another three. We were told who they were, but I won't tell.

The first try would be on Boeing. The expense of repacking the large

slides was considerable—\$8,000, I think they said—and would be on us if a second demonstration was needed. Five of the 10 exit doors would be rendered inoperative, they said. Which five, we asked; they smiled.

The jumbo was towed to a windowless hangar and the doors closed. We three pilots took our cockpit seats and strapped in. The feds scattered the 90 passengers throughout the cabin and made sure their seat belts were fastened. The loading steps were rolled away. At the PA command, "Flight attendants, prepare for departure," the hostesses made their usual pre-takeoff announcement and "armed" the 10 doors.

A handle beside each 747 exit clamps door to slide. When an armed door is cracked, it is mechanically shoved full open; the slide emerges, inflates and is ready for use in half the time you spent reading this line. This is accompanied by a tremendous roar of compressed air and clouds of dust (actually the powder in which the slides are packed).

At last, everyone was ready. All cockpit and cabin lights were on. Down below us were a hundred people watching—Boeing officials, airline officials, FAA inspectors, mechanics. Complete electrical power failure would be simulated by disconnecting the ground power unit. The hangar lights were turned out. We waited.

Suddenly, all the normal lights went out and the emergency lights came on. The captain grabbed the PA mike, "Evacuate! Evacuate!" We went down the spiral stairway three steps at a time. As per procedure I took the right aisle, the flight engineer the left, to ensure passengers were heading for open doors. The hostesses were yelling like drill sergeants, "Come on, come on, move it!" and shoving startled "passengers" through the doors, two at a time—you don't sit down and push off, you run through the door and jump.

When the last passenger was gone, the hostesses followed. Last off were the chief hostess and the engineer, followed by the captain and me. As we reached the ground, the hangar lights came on. Two FAA men compared stopwatches. Nineteen seconds. They said it was a record.

It's one thing to be lectured on emergency evacuation and quite another to be an evacuee. The unusual experience made me feel good about my passengers' safety—and about being a passenger myself. The system works. All the same, I improve the odds by noting the nearest exits and reading the seat-pocket card. So should you. □



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B A X S E A T

OSHKOSH EXPLAINED

B Y G O R D O N B A X T E R

The EAA came up with "Gateway to Aviation '92" as this year's slick moniker for Oshkosh. After 40 years of glory in our hearts this father of all aviation events no longer needs a cute name. "Oshkosh '92" is all you really need. Every aviator in the world knows what that means. Both EAA and Oshkosh have become household words. Relax, just call the next one the "41st Oshkosh." If you have to stop and explain that EAA stands for the Experimental Aircraft Association and that Oshkosh is where it happens—this for the biggest aviation event in America, maybe in the whole world—then you are talking to some straight-legged groundbound wingless wimp and you could go on with an hour's worth of explaining and he would still be staring at you as if you had just arrived and your parachute hadn't opened.

I can't remember how many times I have been to OSH; there is only one other thing in my life beside flying that stays this good for so long. The other one is Christmas. (Gotcha.) But I noticed this year that each time at OSH seems different from the last, even though there is not that much difference in the shows. Nine or 17 AT-6s darken the skies and quench all conversation on the ground. They fly a shotgun pattern, modified choke. You're warned to not walk into fixed objects and hurt thyself while looking up.

All the airplanes do the same thing: Roar low, pull up and do something until it hurts, then swoop down, roar over low and pull up on the other side and do something else at the limits of muscle, bone and airframe. Sometimes the crew sits inside, sometimes stands outdoors on the wing. The universal signal of distress of wing-walker to pilot—like a bug strike or a loose jacket full of hundred-mile-an-hour wind—is to raise one's heels. The pilot is looking at your feet, if you raise one or both heels he knows you are in some kind of trouble up there. Also if for some reason you collapse, the knees bend, raising the heels and automatically

giving the signal. Neat huh? Wayne Pierce told that to my wife, Diane, 15 years ago when she rode the wing of *Ol' Smokey*, his Stearman. I know that was 15 years ago because Jenny is 14 and after Diane got p.g. she became a she-bear and quit all that kind of stuff.

ROAR LOW, PULL UP AND DO SOMETHING AT THE LIMITS OF BONE AND AIRFRAME.

But there is hope. Jenny has a soul for beauty and may do a little wing-walking herself someday.

Oshkosh is not near anything except the Poberezyns. Getting there is an experience pilots will talk about henceforth and evermore. In these latter years I ride the Big Gas Bird, reservations made a year in advance. Below, one sees the twinkle of thousands camping with their smooth little tents, smooth little wives and kids, smooth little airplanes. Bringing small children is extreme. OSH is extreme. Like climbing Mount Everest laid out flat. Sometimes it rains, testing tents, tempers, marriages. Hold this dear in your heart. The elegant masterpiece of the new terminal at ORD, Chicago's O'Hare Airport, was leaking. They had buckets, mops, puddles, just like us. And remember, they spent millions to raise those roofs. My OSH code is merciles: Did you camp out or cop out?

There are always heroes at Oshkosh. This year it was the little band of Doolittle's Raiders, those "Thirty Seconds Over Tokyo" guys who flew bomb-laden B-25 bombers off the deck of the carrier *USS Hornet* 50 years ago and thanked Japan for Pearl Harbor. Most of them eventually got out of China, continued their combat flight careers until the end of the war. A close bunch; "We are a bonded group," said

one. Now in their early 70s, they are aging gracefully. Audiences gave them standing ovations, as well we should have.

I stood long in silent communion beneath the wings of the B-25s parked outside. Thinking of them, of the time I flew and landed J.K. West's B-25, that we could design and build such honest airplanes and engines. The total time average among Doolittle's pilots was less than 250 hours, age under 25, and about 25 hours in type. Takeoff distance was 425 feet. Sure the *Hornet* was doing 30 knots and so was the wind, but would you do it? Then bail out somewhere over China?

I stood out on the flight line looking in silence at how the Wright brothers cut their crankshaft out of a billet of thick solid steel with a drill press. No, they didn't have electric power. And yes, each quarter-inch drill hole was absolutely vertical. And nearby was the tent display of the World War II Glider Pilots. A huge ultralight Waco with a Jeep strapped to the plywood deck behind the pilots to encourage smooth landings in the face of machine-gun fire. In a few years their restoration of the Waco CG-4A will be completed in Kalamazoo. Meanwhile, if you have parts or photos contact Alan Clark, 616/382-6555. OSH and EAA are the sum total of many such heroics, some out of the past, some still going on.

Not all the heroes made it to OSH this year. The cover story of the July *Sport Aviation* publication of the EAA is a heart-tugging piece by Jack Cox (with pin-up pictures by Jim Koepnick) of the years of trials and tribulations of Ralph Rosanik, who has built a faithful replica of the Curtiss P-6E Hawk. Rosanik, 73, Omaha, has spent some tragic and triumphant years in bringing back the only flyable example of this last and most flawlessly beautiful biplane. His goal was OSH this year. But the D-12 Curtiss engine balked again and at this writing they will have to wait until next year. Nobody knows Rosanik yet except readers of *Sport Aviation*. But in

heroic time that airplane will be on display for generations yet unborn at the stately EAA Air Adventure Museum building.

Crowds from all over America come here year-long to shuffle in awed silence through this, the nation's finest aviation museum. Reading, looking, at floor-level or from the graceful cantilevered walkways above which give an open downward view of how pretty we made airplanes back then. Yes, better than the Smithsonian, which must par-

CROWDS FROM ALL OVER SHUFFLE IN AWED SILENCE THRU THE MUSEUM.

cel out its space to include the entire attic of America while the EAA site focuses tight just on airplanes and engines. We love them both. This year I gave half a day to the EAA museum, drifting, sunken in time and the most tender silences, feeling the stealth of years.

And half a day for the happy huckstering of the Fly Market. Beneath flapping tents, row and rows of little plastic boxes of bright little things I couldn't live another day without. The dollar/two-dollar shop jewels. A lady so charming that as she demonstrated to me and sold me the Universal Cutting and Sanding Disc, I put some into my sack of goodies and wandered off in my dreams, leaving my wallet on her table. The lady said, "Somebody find Bax, this is his." No idea of how they tracked me down but nobody even took any samples. Things like this happen all the time at OSH. "The tribe never steals from itself."

And OSH is the one time a year when all us boys and girls of *Flying* see each other, mingle and marvel. One night we had a private dinner. Next night "the kids" were off to do the town and took this old man home early. I sat alone for dinner at the Holiday Inn. The young woman at the next table spoke. Friendly, much beauty. She was Stephanie Ann Klett, Miss Wisconsin 1992. Stephanie gave me her autographed photo. Next morning, bumming a ride out to the airport with Hal Shevers of Sporty's, I asked him if this year seemed quieter, more quality; even the Port-A-Lets smelled sweeter. Hal said, "No, but as the years roll by for us, we each see it differently." □



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PEDAL PUSHING

NO. 629 BY BEN L. BROWN

It was the spring of 1944. I had just picked up a new Bell P-63A Kingcobra fighter at the Buffalo, New York, factory. I had to deliver this plane to the Russians at Fairbanks, Alaska. My aircraft was one of the first half-dozen off the assembly line and was a completely new fighter, a great improvement over the P-39 Airacobra.

I filed my flight plan; my first stop would be Madison, Wisconsin, for fuel. I would fly over Toledo, South Bend and Chicago, refuel at Madison, continue

on to Fargo, North Dakota, and stay that night. Next day, I would fly non-stop to Great Falls, Montana, where the aircraft would be winterized, ultimately continuing on to Fairbanks.

The flight plan was too tempting. I'd spent many months away from home ferrying all types of aircraft; I decided to stop in Toledo for half an hour to visit my parents and relatives. This was not official at all, and if anything happened to the aircraft at Toledo, I would be in very deep trouble.

I landed at Toledo and let everyone see the aircraft. My father wanted to sit in the cockpit to see what it was like. I helped him in, got him seated, and gave him a little cockpit check, explaining the instruments and levers. While he was in the cockpit, I ran into the little airline terminal building for a quick trip to the potty. I came out and got ready to leave, and said my goodbyes to everyone.

I fired up, taxied out and prepared to take off on Runway 22. I knew the airport very well, since I began my private flight training there as a 16-year-old kid in 1938. After doing my cockpit checks, I lined up for takeoff. For the first few hundred feet, you have to use a lot of

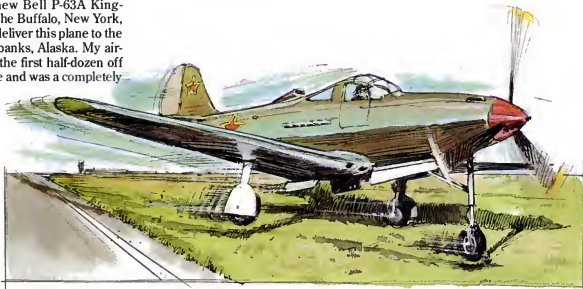


ILLUSTRATION BY BARRY FESS

right rudder until the rudder takes over on the takeoff roll. I suddenly found myself going to the left very quickly in spite of using full right rudder.

Before I could correct, I went off the runway and into the grass, bouncing around all over the area. After getting the aircraft stopped, I sat there and tried to figure out what was wrong. So I taxied back to the runway and tried another takeoff. Same thing happened.

After four takeoff tries, I was dumbfounded: Why can't I hold it straight down the runway on takeoff? Why is it veering off to the left so quickly? I was really sweating by now; what would I do if I couldn't take off? What has suddenly happened to the aircraft to make it do this? I was scared of what would happen to me, because stopping in Toledo was against the rules. It seemed like my number was up.

I finally gathered my senses together and tried to figure out what was wrong. I climbed out of the aircraft as it sat there on the runway with the engine idling, and took a quick look at the rudder; I thought it might have come loose. But everything looked normal. I climbed back in the cockpit, and once

again tried to think it out before I made another takeoff attempt.

I raised my head toward the sky, looking through the glass canopy overhead, maybe in prayer. Then, like a bolt of lightning, it hit me. I noticed in the little rearview mirror that the rudder was cocked to the left, when it should have been in the middle or neutral. I rechecked my rudder pedals and found that even if I pushed the right pedal all the way in to the right, the rudder only went over to the right a little bit. I quickly figured out that my father had hit the rudder adjustment stop on the outside of the rudder pedal, and thus the rudder pedal had just moved forward all the way. When I got in and neutralized the rudder pedals, the rudder cocked to the left almost all the way it could travel. I quickly readjusted the right rudder pedal; I could now see that the rudder was in the middle, and I took off without any more problems.

This taught me several lessons: to remember Murphy's Law, which says that things will always go wrong at the worst possible time; to always adjust my seat or rudder pedals before start-up; and to be sure the aircraft is locked before I leave the ramp. □

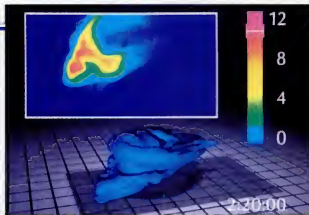
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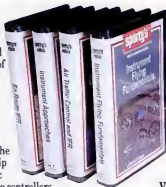
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WRITE IN NO. 51 ON READER SERVICE CARD

FLYING BY WIRE

EDITED BY NIGEL MOLL

**What is fly-by-wire, and why don't more airplanes have it?**

Fly-by-wire is what happens when you turn on your autopilot and then steer the airplane by twiddling knobs. The flight controls are actually manipulated by a computer and servo motors; the pilot tells the computer what he wants the airplane to do. The way the airplane responds to control inputs is governed by "control laws" that can be programmed to achieve desired levels of maneuverability and stability. In a true fly-by-wire airplane, the yoke and pedals are connected to the computer; there is no mechanical connection between the pilot's controls and the control surfaces at all. The great virtue of fly-by-wire is that it can make inherently ill-behaved airplanes behave well. Stability, for example, can be supplied artificially, and so stabilizing surfaces can be made smaller. Stalling and loss of control can be prevented entirely. The price in complexity and redundancy is still too high for most airplanes to pay, but it is likely that in the future a modified kind of fly-by-wire, with manual reversion, could become as common on personal airplanes as power steering and brakes are on automobiles. The basic question is an economic one: Do the benefits of fly-by-wire on simple aircraft outweigh the costs?

What are the differences between "certified ceiling" and "service ceiling"?

The certified ceiling is the maximum

altitude at which an airplane can legally be flown. A service ceiling is the maximum altitude at which an aircraft can maintain a minimal climb rate, typically 100 fpm with all engines operating, or 50 fpm with one engine inoperative. Most naturally aspirated piston aircraft are limited only by their service ceiling, but all turbine-powered aircraft, and most turbocharged piston airplanes, have certified ceilings. Some of the many factors that establish a certified ceiling are: engine-cooling capability; flying qualities, including stability and both low- and high-speed behavior; cabin pressurization limits; availability of emergency oxygen; and structural loading, particularly for pressurized airplanes. Most airplanes can fly higher than their certified ceiling, just as most can carry more than certified maximum weight, but flight above the ceiling (or weight limit) violates the rules.

Why couldn't airplanes have wings that flap?

They could—whereas birds couldn't have propellers. Ornithopters have flown for the last 50 years with various degrees of success. But there are three obstacles to propelling airplanes with the "oarage of wings": mechanical complexity, human ig-

norance, and the absence of any compelling motive for doing so. The big problem is that of converting large amounts of power into delicately modulated linear motions in three axes. One proposal, advanced more than 20 years ago by John Elliot of the Royal Aeronautical Establishment at Farnborough, was to construct a flexible wing in such a way that its flapping motion would be energized by flutter. Unfortunately, no matter how you make the wing flap, the fuselage tends to move the opposite way, to the discomfort of passengers. Paul MacCready, who headed the team that developed a flying mechanical pterosaur for the Smithsonian Institution, points out that the mechanical efficiency of a flapping wing is no better than that of propellers, and propellers (or other rotary devices, like jet engines) are much more mechanically convenient. Flapping wings have the advantage of STOL capability—but all things considered, it's simpler to fix the wings and build long runways, just as it's simpler to build a road across a swamp than to provide cars with legs.

If you have a question for Unicom, send it to Flying, 500 West Putnam Avenue, Greenwich, Connecticut 06830; fax 203/622-2725. □

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